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XT WEEK • • •

Cutting Costs, Increasing Output with Machine Tools—Honing and Lapping
Casting Fastening Hardware
Inspection of Incoming Material
Conditioning Galvanizing Baths

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 121, NO. 6 AUGUST 11, 1947

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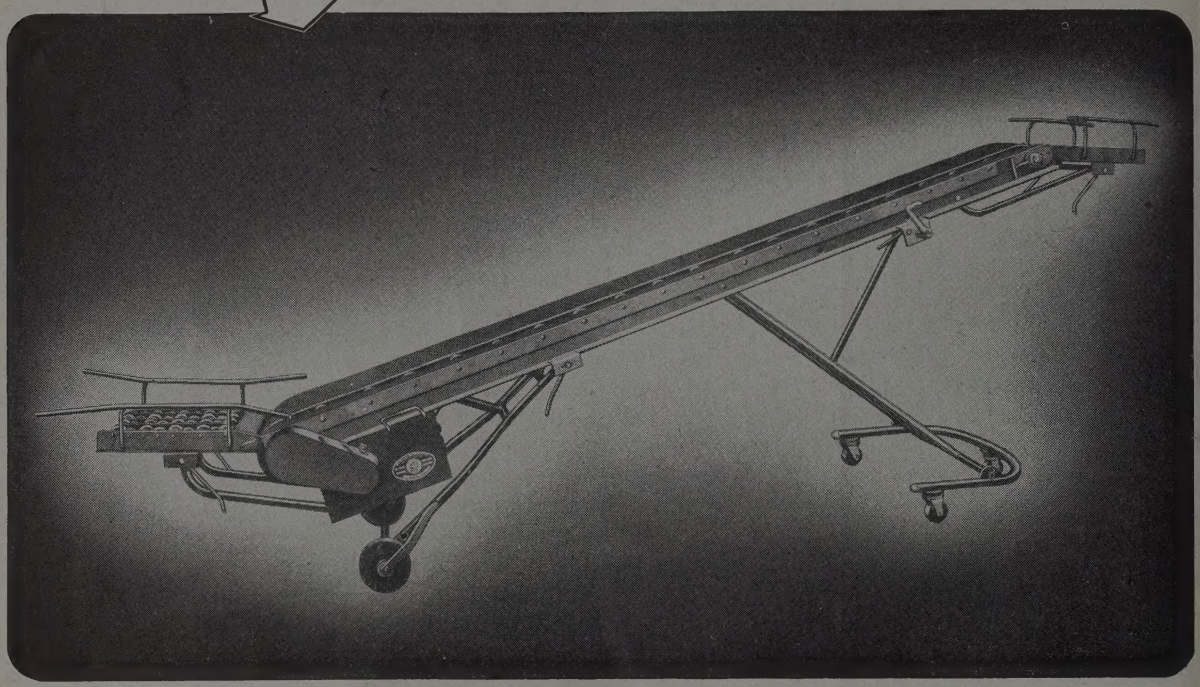

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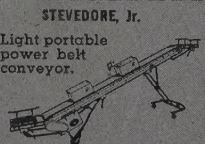

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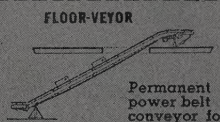

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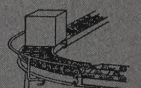

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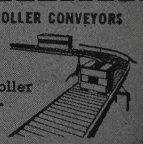

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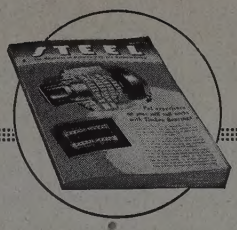

August 11, 1947

Above the Law

Current events indicate how difficult it will be to achieve an equitable balance of rights and responsibilities between employers and employees. The Wagner Act, its one-sided administration and the 15-year political alliance between labor and government have placed labor in a position of power which it will fight to retain.

How hard it will fight is shown by the actions of unions since the new labor bill became law. John L. Lewis insisted that his contract with the mine operators exempt his union from the provisions of the Taft-Hartley Act. This was accomplished by the "able and willing to work" clause. Employees of Murray Corp. of America demanded contract protection from legal action for violation of agreements under the Taft-Hartley law and struck when it was not granted. Until the eleventh hour last Tuesday employees of Ford Motor Co. were prepared to strike unless they were given similar immunity. There are other cases wherein the new labor law is the basis of discord.

The threatened Ford strike was averted by the expedient of allowing a year's grace from the penalties of the current labor law. This means that the union will not be held liable for breach of contract because of strike or work stoppage for a period of a year. Meanwhile, a joint committee will try to work out a mutually acceptable code of employer and company privileges and responsibilities.

Thus, for a period of at least a year, CIO has won the same immunity from the law that Mr. Lewis gained for the United Mine Workers. At first glance, one might conclude that union strategists have managed to retain the one-sided spirit of the Wagner Act to the effect that a union can do no wrong.

However, this strategy is likely to backfire. Mine workers and Ford employees won immunity through pressure at a time when employers were in no position to resist. In avoiding the law, the unions are banking on direct deals with employers. Right now direct dealing is highly advantageous to unions, but a day will come—not too far distant—when the advantage will be with employers. When that time comes, some union chieftains will not be as keen for pressure in direct dealing as they are today. They will be yelling to high heaven for the protection of law.

Those who live above the law at first think it is clever. Next it is uncomfortable and finally it becomes unbearable.

o o o

LIMITS USE OF AUTOS: George Romney, managing director of the Automobile Manufacturers Association, writing as guest editor of this week's "Mirrors of Motordom," brings up a topic that should interest every industrialist who supplies anything to the automobile industry.

He says that manufacturers have a responsibility beyond that of making a reliable product. It is to help make possible the full and proper use of their product, once it is sold.

On this score, automobile manufacturers as well as the principal suppliers of materials, equipment and parts should be concerned about the increasing threats to the proper use of automobiles and trucks. There is ample evidence that the use of these vehicles will become more and more restricted and difficult. This is because the highways of the nation are inadequate and antiquated; parking facilities are inadequate, too costly or inconveniently situated; training of drivers is haphazard and unsatisfactory and finally, the accident rate of operating a motor vehicle is too high.

Mr. Romney points out that these are public problems, which are the primary responsibility of

(OVER)

public officials—federal, state and local. "Nevertheless," he says, "industries whose products are important in providing highway transport facilities should give active support to those who carry the primary responsibility in these matters."

This is a timely discussion of conditions that are getting worse instead of better. Their solution is a real challenge. —p. 65

* * *

TROUBLE IN BRITAIN: Our London office reports progress in the British iron and steel industry's $672 million development program. To date plans involving $560 million in new blast furnace, steelmaking and rolling mill capacity have been worked out by the industry and submitted to the Iron & Steel Board. Board approval in detail has been given to plans involving $360 million.

This is a substantial sum, considering the size of the British industry, and it assumes even more impressive proportions after one has read Prime Minister Attlee's "save Britain" plan, addressed to Parliament last Wednesday. This message announced more controls, more planned economy and more privation. It spurned the suggestion of a coalition government, which means the Labor party is determined to "save Britain" by socialism.

It takes courage to go ahead with improvements when one's business is earmarked for nationalization. We hope the British steelmakers can proceed with their expansion plans, because the days of the Labor government and its futile economic program are numbered. —p. 62

* * *

MODERN GEAR CUTTING: Reading Guy Hubbard's article on gear making recalls an incident in the writer's youth. Near the end of a 10-hour day the boss said "Run home, eat and rush back. There will be a forged gear blank on the floor. Stay with it until you finish it according to blueprint."

I went home, explained my predicament to the hostess of a party to which I had been invited, ate and returned. The blank was so hot I had difficulty chucking it. After boring and turning it, I put it on an arbor and mounted it on a universal miller with index head. I took one heavy roughing cut and one finishing cut. By pushing feeds and speeds to the limit, I was able to complete the job by 11 o'clock and to get in on the tag end of the party.

How much of that party I could have enjoyed had I the use of today's gear making facilities!

—p. 80

SIGNS OF THE TIMES: One reason for the extensive airing that the problem of steel capacity will receive in Washington during the next few weeks is that scarcity of steel may become an important political issue in 1948. The Democrats are pushing for marked increases in capacity and some, including Senator Murray (p.58), would go as far as to have the government build facilities if the industry will not. The Republicans want something tangible—preferably with strong public vote appeal—with which to combat this threat. . . . In 1908 there was a single mile of modern improved hard surface interstate highway in the United States. Today there are 235,000 miles in the primary federal and highway system (p. 65), but it is woefully inadequate to handle current traffic volume. . . . A bill authorizing a census of business for 1948 was passed by the Senate but was not acted upon in the House. It can be called up at the next session of Congress, but inasmuch as it takes considerable time to organize for a project of this size (p. 60) it is doubtful whether approval can be given in time to enable the Census Bureau to make a census in 1948. . . . . New construction in July was up 8 per cent over that of June and 16 per cent over that of July last year. Value of new construction for the first seven months of 1947 is estimated at $6,478,000,000 (p. 70), compared with $4,806,000,000 in the corresponding period of 1946. . . Price increases announced by subsidiaries of United States Steel Corp. are less on some products than those posted by independent steel producers (p. 52, 137), thereby creating a somewhat unusual dual base price structure. . . . Tests at the Hamilton works of the Steel Co. of Canada indicate that the introduction of oxygen at the point of entry in open-hearth furnaces (p. 94), greatly increases the efficiency of fuel oil ignition and provides a new tool for controlling length of flame, its calorific output and travel within greater limits. Reduction in melting time was 2½ hours. . . Although the National Security Act of 1947 provides for a considerable degree of coordination of the three major units composing the "National Military establishment" under Secretary of Defense James V. Forrestal (p. 61), the procurement policy of the new set-up will provide for separate and independent purchasing by the Army, Navy and Air Force.

E. L. Shaner

EDITOR-IN-CHIEF

IT takes more than modern scientific methods to make quality steel. It takes men . . . good men . . . to make good steel. The knowledge, experience, and judgment of every steelmaker . . . from supervisor to men on the floor . . . determines the quality of a steel. Inland men take a personal pride in their skill. They blend a part of themselves into every ton of steel they turn out. And the steel they produce is steel they are proud of . . . steel you can use with confidence.

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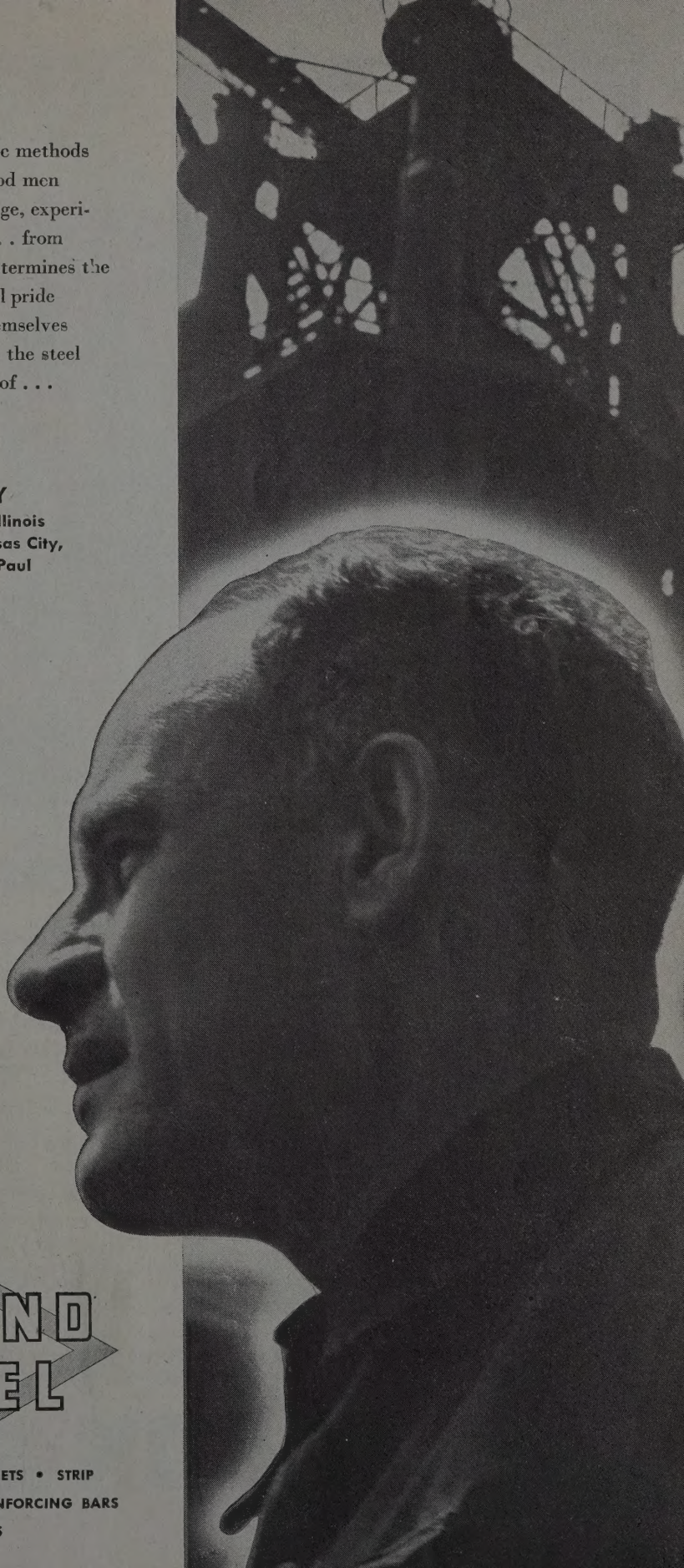

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RYERSON STEEL

Pipe Demand Exceeds Supply

STEEL
August
11
1947

Tubular goods rank high among scarce steel products. Pipeline requirements 20 times greater than prewar volume. Expansions of capacity under way, but are slowed by labor difficulties and materials shortages

"KNOW where I can buy a couple hundred feet of 1¼ and 3-in. standard pipe?"

This question startled a group of newsmen in a Midwestern steelmaking center recently. It was posed by a top sales executive of one of the larger steel companies, a man who has several million tons of finished steel a year to sell. But he was having difficulty obtaining a small amount of pipe for use as bridge rails and guards on a private estate.

This situation points up the acute shortage of practically all kinds of pipe and tubular goods. In point of scarcity, pipe ranks after flat-rolled carbon items, small carbon bars, some wire products and a few shapes. Historically, pipe and tubular goods account for about 10 per cent of total finished steel production.

Demand since the war's end has expanded tremendously over prewar. Rated capacity of the industry to produce is somewhat lower, having dropped from 8,300,000 tons annually in 1944 to 7,650,000 at the beginning of 1947. The decrease is due primarily to the obsolescence of lap weld facilities.

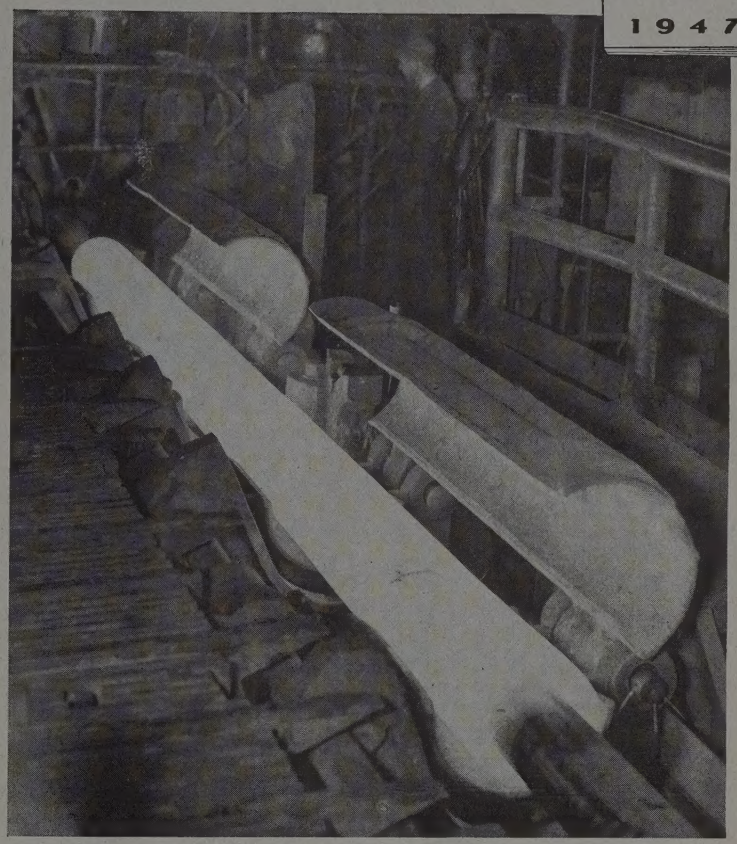
Pipe makers are subject to the same allotments as other consumers and generally are not getting enough steel to operate at capacity.

New Capacity Ready by 1948

Some new facilities are being constructed but few of these will add to effective capacity before late 1948. National Tube Co., United States Steel Corp. subsidiary, is bringing in capacity for specialty and alloy items at Gary, Ind., but this does not yet figure prominently in the picture.

Larger expansions of pipe making facilities have been delayed by shortages of electrical equipment due to strikes at suppliers' plants, to material scarcities and to labor difficulties among construction workers. Another year or 18 months will elapse before facilities now under construction will be in full production.

Production of pipe and tubing this year is expected to exceed 5.5 million tons, about a million tons more than was produced in 1946 and will be exceeded only by the peak war years.



Greatest expansion in pipe demand is for oil pipelines, where the market is estimated to be 20 times greater than prewar. Photo shows piercing of a hot steel billet in manufacture of large-diameter seamless pipe of an oil line at the Lorain, O., plant of National Tube Co., U. S. Steel Corp. subsidiary

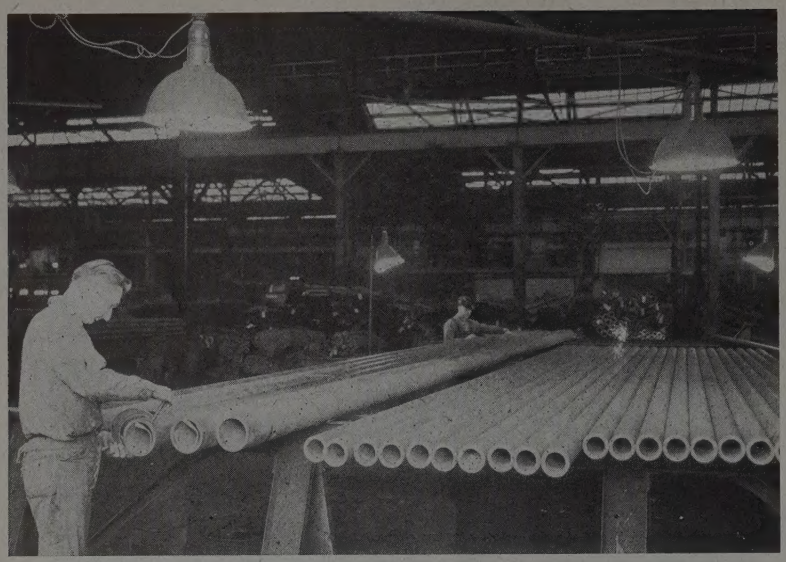
Year	Tons	Year	Tons
1931	2,059,421	1939	3,764,272
1932	1,107,542	1940	4,272,684
1933	1,588,353	1941	5,736,906
1934	2,045,887	1942	5,283,844
1935	2,276,544	1943	6,219,345
1936	3,643,779	1944	6,406,423
1937	4,282,584	1945	6,030,243
1938	2,580,463	1946	4,689,032

Average production for the ten prewar years, 1931 to 1940, was 2.7 million tons, and for the 4-year period, 1937 to 1940, average output was 3.7 million tons. Thus current production is more than double that of the average in the prewar decade and well in excess of the previous peak peacetime years. However, it is inadequate to meet today's expanded postwar demand.

Greatest expansion in postwar demand has been for all pipelines. Pipeline fabricators now are asking the mills for a million tons of steel annually or 20 times the prewar average. Pipeline manufacturers are promised for several years ahead and one large Midwestern fabricator is booked solidly through 1952. These fabricators are finding their steel allotments woefully inadequate to meet the unusual demand.

Oil well drilling, which was curtailed during the war, has been accelerated during the past two years to meet an expanded demand for petroleum products. New oil wells are about 8 per cent deeper than the average prewar well, necessitating more pipe per well. During the war period an average of 23,693 new wells were drilled per year. In 1946, new drillings increased 27 per cent to 30,221. The drilling program for 1947 shows a further increase.

Demand for refinery pipe and tubing for maintenance and new construction is



Inspectors make final check of seamless steel tubing at the plant of Timken Roller Bearing Co., Canton, O. Seamless tubing is used extensively in the fabrication of cylindrical parts

estimated to have increased 7 times the prewar demand. This tonnage, however, represents only a small percentage of the total tubular tonnage.

Standard pipe and miscellaneous line pipe are used for so many and scattered purposes that demand is difficult to estimate. Producers say that distributors are pressing for greater allocations, often double what they are receiving. Mill officials estimate four months would be required to rebuild inventories at mills and distributors to a prewar ratio commensurate with present production if no pipe were shipped to consumers during that period.

Home construction and other building are contributing substantially to the demand for standard pipe. Although the volume of such building is short of goals, it still is greater than generally realized.

The accelerated railroad car building program is requiring a greater amount of pipe than in prewar years. Requirements per car range upward from 60 to 80 ft per car.

A few tubular products, however, are in easy supply. High-alloy tubing has been readily available at good deliveries for several months. Drill pipe supply is approaching demand. The gap between demand and supply of cold-formed mechanical tubing is narrowing and many distributors are prepared to offer mechanical tubing in some grades and sizes for immediate delivery.

What is the outlook? Pipe producers do not offer a great deal of encouragement. They point out that if demand for other steel products declines before pipe and tubing, more semifinished steel may be released for processing into pipe on the industry's present pipemaking capacity. The increase in output, however, would be limited.

The petroleum industry has been attempting to persuade the steel industry to expand its facilities for making pipe, and has suggested that both increases in ingot capacity and pipemaking facilities are needed. The oil people argue that their industry's present demand is not wholly a postwar inflation but will continue for years to come.

The steel producers are doubtful about this. W. F. McConnor, vice president in charge of sales, National Tube Co., says: "It is questionable whether the sustained demand over a long postwar period would justify increased tubular capacity. The actual figures indicate that the industry on a normal basis, with equipment in good shape, unhampered by strikes, shortages, etc., could produce about 5.5 million tons per year with a good peacetime products mix. This is 48 per cent over the 1937-40 average consumption.

"The high costs of construction considered against the low profit position of pipe and tubing are not conducive to expediting further capacity increases."

National Tube has embarked on an $85 million postwar program of rehabilitation and expansion, involving the revamping of butt mill facilities; a complete new mill warehouse for the handling of standard and miscellaneous line pipe; a new coke plant; a new blooming mill, billet mill and bar mill; additional ingot capacity amounting to about 30,000 tons a month; and a new seamless mill to manufacture 2 to 4-in. pipe. The last-named mill is a fast, high production unit embodying new principles and will outrank any other seamless mill the company now operates. National Tube also is consolidating two of its plants for the building of specialty tubing at its Gary plant.

Construction costs are rising so rapidly that the cost of installing the new equipment will greatly exceed the orginal $85 million appropriation. The program when completed will increase output by 13 per cent. Chief gain, however, will be better balancing of the trade requirements.

Kaiser Co. Inc. expects to have in operation by the end of this year a Fretz-Moon butt mill, rated at 10,000 tons a month. Consolidated Steel Corp. has installed controlled arc-weld equipment in Los Angeles for the fabrication of large diameter pipe from plates for oil and gas trunk lines.

Additional Facilities Available

During the war, the government financed a number of tubular goods facilities, most of which now are available for civilian production. These include, listed by their wartime operators, location of fabrication, product and increase in capacity: United States Steel Corp., Gary, Ind., cold-finished tubing, 43,200 tons and hot-finished tubing, 24,000 tons; Babcock & Wilcox Tube Co., Alliance, O., electric weld tubing, 48,000 tons, and Beaver Falls, Pa., seamless tubing, about 50,000 tons; National Supply Co., Ambridge, Pa., annealing facilities, seamless pipe, 5122 tons; Timken Roller Bearing Co., Canton, O., seamless tubing, over 5000 tons, and Newton Falls, O., tube finishing facilities; Agaloy Tubing Co., Springfield, O., tubing, 2400 tons; Brown Fence & Wire Co., Adrian, Mich., tubing, 27,852 tons; Pacific Tube Co., Los Angeles, electric weld tube facilities, 16,500 tons; Revere Copper & Brass Inc., Rome, N. Y., electric weld tubing, 7500 tons; Standard Tube Co., Detroit, Mich., cold-finished tubing, 21,600 tons; Tube Reducing Corp., Wellington, N. Y., cold-drawn seamless tubing, 6000 tons, and cold-reduced special tubing, 27,000 tons. The government also financed electric weld tubing facilities operated by Republic Steel Corp. at Brooklyn, N. Y., and Cleveland, by Mark & Co. at Evansville, Ill., and by Michigan Steel Tube Products Co. at Hamtramck, Mich.

A large proportion of pipe and tubing is sold through warehouse and oil country goods distributors. In 1946, this outlet accounted for 2,601,500 tons of the total production of 4,689,932 tons.

By products, seamless is now the leader, production in 1946 being 1,954,981 tons. Next in line is butt weld with 1,321,682 tons in 1946, followed by electric weld with 675,050, mechanical

and pressure tubing with 432,658 and lap weld with 305,754.

The machinery and automotive builders are the leading consumers of mechanical and pressure tubing. Oil and gas, construction, converters and processors and machinery take large quantities of seamless. Construction is high bidder for electric weld, while oil and gas, electrical machinery and converters and processors are leading consumers of butt weld.

Chapman-Price Steel Mill Bought by Kaiser-Frazer

Kaiser - Frazer Corp., Willow Run, Mich., last week purchased the Chapman-Price Steel Co., Indianapolis, subsidiary of Continental Steel Corp., Kokomo, Ind. Kaiser-Frazer will take over the property of the steel rolling mill on Oct. 1

The Indianapolis mill has a capacity of 55,000 tons annually—20 per cent of the amount of sheet steel Kaiser-Frazer uses in current production of its automobiles. Kaiser-Frazer has a contract with Continental Steel Corp. to furnish sheet bar to the mill. The production of the Chapman-Price mill, together with the products received from Portsmouth Steel Corp. by reason of K-F's contract with Portsmouth, and the steel secured from other sources, will assist Kaiser-Frazer in achieving its present goal of 2000 cars a day.

The Indianapolis plant covers 40 acres and is equipped with heating furnaces, annealing furnaces, pickling equipment, breakdown, finishing and cold flattening mills. Sheet from the Indianapolis mill will be used for floor pans and reinforcing members of the Kaiser and the Frazer bodies, they said.

Recently Kaiser-Frazer acquired the Round Oak Co. foundry at Dowagiac, Mich., gray iron castings interest.

July Kaiser-Frazer automobile production at Willow Run reached a new all-time high with a total of 13,213 cars manufactured. Despite material shortages which closed the plant for a day and a half, the July figure exceeded that of June's 12,039, a previous record.

Army Suspends Delivery on Ferrous Scrap in Germany

The United States Army has suspended deliveries to Canterbury Corp., a Delaware corporation with headquarters in Paris, France, against a recent sale of 147,308 tons of ferrous scrap in Germany.

This action resulted from a request by the Steel Subcommittee of the Senate Small Business Committee following testimony of E. C. Barringer and L. D. Greene as representatives of the Steel, Foundry & Scrap Industries Committee for Expediting Scrap. They pointed out that, although the Army had sold the scrap for $1,113,305 with the stipulation that it be shipped to the United States, they were afraid that much of it would never leave Europe since the scrap shortage there is also acute.

The Army has stipulated that it will cancel the sale unless Canterbury shows it had American buyers for the material and has made commitments for ship space to transport the scrap to the United States. At the time deliveries were suspended, 450 tons had already been shipped.

4000 Attend Open House At Dodge Mfg. Corp.

More than 4000 persons attended a 3-day openhouse held by the Dodge Mfg. Corp., Mishawaka, Ind., Aug. 4-6, or in the ratio of nearly three persons to each of Dodge's 1389 employees. Relatives, friends and workers in other plants in the area were invited to attend.

W. W. French, director of advertising and sales promotion, handled the affair as general chairman. Five junior executives were appointed assistant chairmen to head up committees charged with carrying out various phases of the program. Several top executives served on these committees.

Dodge was founded in 1878 to make wood hardware. Wallace H. Dodge, founder, invented the wood split pulley with interchangeable bushings which was widely accepted in industry and started the company in the power transmission business.

Steel Industry Safety Record Improves in 1946

Steel industry continued to improve its safety record in 1946, according to the American Iron & Steel Institute. It reduced its accident frequency rate, as computed by the National Safety Council, to 7.19 accidents per million man hours, the lowest point in the past five years, representing an improvement of 11 per cent from the wartime figure of 8.1 accidents per million man hours in 1944. In 1945 the rate was 7.23 accidents per million man hours, and in both 1942 and 1943 it was 7.4 per million man hours.

Present, Past and Pending

■ DISCONTINUES STRUCTURAL FABRICATING

MINNEAPOLIS—Minneapolis-Moline Power Implement Co. is discontinuing its steel fabrication activity after 50 years in the business, and will concentrate its production capacity on the manufacture of farm machinery.

■ SCIENCE FOUNDATION ACT VETOED

WASHINGTON—President Truman has vetoed the National Science Foundation Act as being administratively unsound in that the foundation would be run by 24 part-time experts who would appoint their own administrative officer. He also objected to the provision that the 24 men would have full power to distribute large sums of federal money to scientific institutions, by which in many cases they would be employed.

■ NAMED DELEGATES TO ILO SESSION AT STOCKHOLM

WASHINGTON—Steel industry delegates to the International Labor Organization meeting at Stockholm, Sweden, Aug. 19, will be George T. Fonda, assistant to the president, Weirton Steel Co., and C. H. Murray, vice president, American Rolling Mill Co. E. C. Myers, United States Steel Corp., and A. M. Rupkey, Bethlehem Steel Co., will be alternates, Grover C. Brown, American Iron & Steel Institute, will be an advisor.

■ PLANS TO COMPLETE RUSK BLAST FURNACE IN TEXAS

WASHINGTON—Plans to complete the Rusk blast furnace in east Texas have been approved by the War Assets Administration. WAA has accepted a bid by McCrossin & Co. of Texas to do the work.

■ JOLIET FURNACES TO BE RECONSTRUCTED

JOLIET, ILL.—Two billet heating furnaces of the American Steel & Wire Co. will be reconstructed by the Rust Furnace Co., Pittsburgh. Capacity of the furnaces will be increased to compensate for proposed increase in speed of two of the company's continuous rod mills.

■ FREIGHT CAR RENTAL RAISED TO $2 DAILY

WASHINGTON—Interstate Commerce Commission has ordered a $2 daily rental charge for use of freight cars effective Oct. 1. Tank and refrigerator cars are excluded from the order. Present daily rental is $1.25.

Dual Prices Confuse Steel Buyers

U.S. Steel quoting lower base prices on galvanized, long ternes, enameling sheets and semifinished items than independents. Industry explains increases on basis of higher costs, up $600 million since January

DUAL base prices for some steel products are perplexing metalworking companies and steel distributors, attempting to adjust their prices in line with increased materials and labor costs.

The price spread results from announcement by United States Steel Corp. subsidiaries of price increases on some finished and semifinished products in lesser amounts than those announced earlier by the leading independent steelmakers. Galvanized sheets are quoted by the U. S. Steel subsidiaries at $2 a ton under the independents, an increase of $6 a ton by the Corporation against $8 by the independents. Enameling sheets were advanced $7 a ton by U. S. Steel and $8 by most other producers. Long ternes were upped $10 by independent producers, but only $6 by U. S. Steel.

Among the semifinished items, wire rods are quoted at $2.80 per 100 lb by U. S. Steel and from $2.85 to $3.05 by the other makers. Skelp was advanced $5 a ton by U. S. Steel and $6 by the others. Blooms, billets and slabs for rerolling were advanced $3 by Big Steel and $8 by the independents. Forging quality blooms, billets and slabs were advanced $5 by the Corporation and $8 by the independents.

The spread is believed to result from the adherence of U. S. Steel to its decision reached at the time of the signing of the coal wage settlement not to advance prices more than an average of $5 a ton. In the interim before U. S. Steel's price announcement, the independent producers announced increases averaging close to $6 a ton.

No cancellations were reported by the companies quoting the higher prices last week although numerous protests were heard. Price, when it is a matter of only a dollar or so a ton, is a secondary consideration to steel buying companies in today's market. This split price situation, steel producers believe, may continue for some weeks, although eventually the spread will be eliminated by competition. Some observers, however, believe U. S. Steel will raise its prices to meet those of the independents before competition forces the latter to meet U. S. Steel's quotations.

Some steel producers believe the new higher prices on certain steel products are inadequate to put them on the profit side of the ledger. A leading producer of galvanized sheets, for example, says the increase on this item should have been $12, instead of the $8 made by independent producers. At the new prices, galvanized sheets will continue to be either a low-profit or a loss item and little improvement in supply can be expected.

Wire rod increases are believed to be too low by some producers, who think this product should have been raised several dollars more.

Producers quoting levels higher than those of the Corporation point out their increases are based on thorough cost studies and are easily justified from an economic standpoint.

The American Iron & Steel Institute in newspaper advertisements last week explained the reasons for the steel price increase on the basis of rising costs for transportation, labor and materials. Costs of the industry have advanced more than $600 million a year since January. This amount is nearly equal to the industry profits for the past three years ($675 million) and almost equal to dividends paid in the past four years ($618 million). It is more than double the industry's reserves at the end of 1946, approximately equal to 12 per cent of the industry's sales in 1946, and amounts to nearly $10 a ton on anticipated finished steel production of 62 million tons in 1947.

Cost increases since January are itemized as follows:

Jan. 1, 1947, freight rate increase (17 to 18 per cent), $75 million.

Apr. 1, 1947, steel wage increase, $240 million.

January to July, fuel oil increase, $30 million.

January to July, steel scrap price increase ($9 to $10 a ton), $160 million.

January to July, miscellaneous price increases, including tin, copper, lead, palm oil, $11 million.

July, 1947, higher coal costs (estimated at $1 a ton as result of coal wage settlement), $90 million.

This adds up to a total increase in costs of $606 million annually.

Certain other costs steel mills must pay also have risen sharply. Maintenance and repair costs averaged $6.30 a ton of hot-rolled production in 1940 and jumped to $9.07 per ton in 1945, and a further increase has occurred since. Higher depreciation reserves are necessitated because of the rising cost of new equipment.

The Institute points out the increases in iron and steel have been modest in comparison with other cost increases. Citing Bureau of Labor Statistics figures on wholesale commodity price indexes, it shows the following:

	% Gain May 1947 Over Aver. For 1939	% Gain May 1947 Over Aver. For 1946
Iron and steel	34.2	16.9
All commodities	90.5	21.5
Farm Products	169.1	18.2
Foods	127.0	22.5
Hides and leather	73.2	21.6
Textile products	99.3	19.3
Motor vehicles	59.9	17.2*
Nonferrous metals	84.5	45.4
Building materials	95.6	33.3
Lumber	189.1	51.3

*7 months average

According to the Bureau of Labor Statistics, the steel price index average in 1939 was 95.8, and for May of this year 128.6, an increase of 34.2 per cent. Even the July increases will lift steel to only 45 per cent over 1939, as compared with 90 per cent for all commodities and 105 per cent for weekly earnings of steel wage earners.

Auto Builders Raise Prices 2-7 Per Cent

FIRST major consumer goods price increases to follow the advance in steel prices came from the automotive industry.

General Motors Corp. advanced prices on its automobiles and trucks from 2 to 6 per cent, with increases on automobiles ranging from $57 to $168 a unit. Price adjustments on nonautomotive parts will follow the same general pattern as for passenger cars and trucks.

Packard Motor Car Co. followed with increases on all models, ranging from 3 to 7 per cent, with individual models raised from $82 to $200.

C. E. Wilson, G. M. president, explained the increases were designed to "meet in part recently increased labor and material costs." The increase, first since November, 1946, is necessitated by the following advances in costs: Labor, up 12 per cent as result of the contract signed with the United Automobile Workers in April; steel costs, up 17 per cent since November; pig iron, up 29 per cent; copper, up 26 per cent; coal, up 22 per cent; tin, up 22 per cent; lead,

NEW COLD FINISHED STEEL PRODUCER: Shown above is the partially completed plant of the recently organized Precision Drawn Steel Co. Inc., Camden, N. J., which is scheduled to go into production Nov. 1, with a capacity of 50,000 tons of cold finished steel a year. The facility will have 50,000 sq ft of floor area, with equipment to be installed for straight line production and to include draw benches, straightening machines, turning and grinding machines and conveyors for expediting the handling of materials. A full range of standard sizes and special shapes will be produced.

Chairman of the new firm is Ralph Cornell, Woodbury, N. J., who heads a construction company under his name. President is Paul W. Newcomb, formerly sales manager of Keystone Drawn Steel Co., Spring City, Pa., with which he was associated for 20 years. George H. Hulse, formerly assistant general purchasing agent, Philco Corp., Philadelphia, and for 18 years with that firm, has been named vice president and secretary of Precision. Henry J. Bauman is vice president and general manager. Previously Mr. Bauman had for six years been manager of the Cold Drawn Bar Division, Pennsylvania Iron & Steel Co., Los Angeles, and for a similar period prior to that had been vice president and general manager of Empire Finished Steel Corp., Newark, N. J., following a 10-year affiliation with Keystone where he had been general superintendent

up 43 per cent; cotton, up 23 per cent; and wool, up 12 per cent.

Only price reduction has been in crude rubber, which has been reduced 30 per cent from wartime levels. This has been partially offset by the increase in cotton and in labor in tire manufacturing plants.

Packard attributed its price advances to the higher costs of materials and parts, such as steel, brakes and wheels. Packard incurred a loss of $1,872,634 in the first six months.

Other metalworking companies are conducting cost studies to determine what price adjustments will be made necessary by the cost increases. Many indicate some adjustment will be necessary but say several weeks will be required to determine the amount.

Makers of electrical household appliances generally indicated they will wait about 30 days before announcing price action. Many say that if they could obtain a sufficient quantity of steel and other materials at quoted prices they would be able to absorb the recent steel price advance. The difficulty arises, however, when they either must buy steel through irregular channels at fancy prices or accept substitute materials which must be reworked before using.

Actually the steel price increase alone would not be sufficient to disturb the price structure. The steel price increases average less than one-third cent a lb and would add only $11 to the cost of the average passenger automobile, requiring 3500 lb steel.

For other typical consumer items, the new steel price will add about 65 cents to the price of a mechanical refrigerator (200 lb steel), 90 cents to an office desk (300 lb), $5 to a farm tractor (1500 lb), 8 cents to a lawn mower (28 lb), 39 cents to a kitchen cabinet (130 lb), and 6 cents to a garbage can (20 lb).

Consumer Credit Controls To Be Lifted by Nov. 1

Major factor in causing Congress to vote an end to all controls on consumer credit on Nov. 1, 1947, was the record of the Federal Reserve Board in applying such controls. When the board last December revised its regulation W, it left only 12 commodities under curbs. Such action, said Rep. Jesse P. Wolcott (Rep., Mich.), chairman of the House Banking & Currency Committee, was discriminatory against certain industries, and also against many consumers—especially veterans—who had not built up savings during the war.

The real intention in retaining only 12 commodities under curbs, Mr. Wolcott pointed out, was to relieve material shortages, particularly those of steel, as can be seen from calling off the commodities on which curbs were retained. These include automobiles, household stoves and ranges, dishwashers, ironers, refrigerators and food freezers, washing machines, room-unit air conditioners, radios, vacuum cleaners, sewing machines, phonographs.

"The policy," said Mr. Wolcott, "smacks of a benevolent government directing the people as to what they should or should not buy——of discriminating against the very people against whom Congress does not want to discriminate —the people who did not save money during the war or who have lost their savings. If there is good reason for controlling consumer credit, why not regulate diamond rings, fur coats, and other luxuries?"

Now that Congress has put an end to consumer credit control as of Nov. 1, observers feel that there exists a general belief in the government that the use of credit will increase rapidly—and that such an increase is only natural, and to a considerable extent desirable.

In the meantime, the Federal Reserve Board tentatively has decided to construe the congressional action as a mandate and proposes to continue its present controls until Nov. 1.

Circumvention of New Labor Law Brings Criticism

Agreements exempting unions from Taft-Hartley Act are deplored. NLRB believes such clauses unenforceable

AGREEMENT between the Ford Motor Co. and the United Automobile Workers-CIO last week on a contract provision concerning union financial responsibility sections of the new Taft-Hartley labor law has prompted comments that big business is capitulating headlong to demands of the unions and co-operating with them in sidestepping the new law. Only last month the United Mine Workers-AFL won a circumvention of the new labor law through their new contract which states that miners are to work when "willing and able" instead of agreeing as in old contract not to strike.

Elsewhere, unions were continuing their onslaught against the new labor law. This kept closed the plants of the Murray Corp. of America, Detroit, supplier to Ford, with a result that immediately after Ford averted a strike in its own plants it suspended assembly operations nearly a week because of a lack of supplies from Murray Corp. At Washington, suit was filed in district court by the Foreman's Association of America asking for a judgment declaring the new Taft-Hartley Act unconstitutional. The issues, reports from Washington said, are not such as to be settled, however, short of a decision from the U. S. Supreme Court.

Steelworkers Plan Attack

Another attack shaping up against the Taft-Hartley law is that of the United Steelworkers of America-CIO, which has called its entire staff of directors and staff representatives from all of the 34 districts of the United States to a meeting Aug. 11 in Pittsburgh. At this meeting, they are to be acquainted with all provisions of the new labor law and briefed for an intense political drive of the CIO Political Action Committee for defeat in 1948 elections of congressmen who voted for the Taft-Hartley law and for overriding the President's veto of it.

The agreement which Ford Motor Co. and the union reached concerning union financial responsibility under the new labor law provides that a committee shall attempt to work out a solution to the question of union liability for damages by suit for breach of contract. Total time spent in such deliberations and negotiations is not to exceed one year. Meanwhile, the union, its officers and members shall not be liable for breach of contract because of any strike or work stoppage which may occur during the period of these deliberations and negotiations. This in effect means the union will be free during that period, perhaps as long as a year, from some of the important clauses of the Taft-Hartley law.

NLRB MEMBERS SWORN IN: Two new members of the National Labor Relations Board and the general counsel take the oath of office under interim appointments made by the President, following failure of the Senate to confirm their nominations. Left to right: J. Copeland Gray, Buffalo, a labor consultant; Abe Murdock, former senator from Utah; Robert N. Denham, the new general counsel and former trial examiner for the board; Judge George D. Neilson, who administered the oath. NEA photo

That freedom has prompted numerous industrial spokesmen to charge that Ford has sidestepped the issue of union liability under the new law and left the problem for other companies to face. The spokesmen point out that the arrangement worked out by Ford and the union is a face-saving action by both sides. Ford, they say, did not completely waive its rights under the new law to hold the union responsible but gave the union temporary exemption, which, however, can run as long as a year, the length of some labor-management contracts. And regardless of the type of agreement, the union, observers say, got what it wanted—exemption from financial responsibility under the new labor law.

In view of such agreements as have been reached by Ford and by the coal mine operators, there arises among observers the question how can legislators be expected to pass laws to protect employers if the latter scuttle what they had wanted and been given.

Analysts of the situation are puzzling over what is prompting industry to cooperate with the unions in circumventing the new law. Among questions they raise are: 1. Are the tremendous consumer demand and prospects for substantial profits influencing industry to endeavor to keep operating at any price even if it necessitates major concessions to labor? 2. Is a desire to avoid precipitation of a recession through serious strikes influencing industry to accede to union demands? 3. In making major concessions to labor is industry, which is traditionally Republican, seeking to mitigate in 1948 elections union retaliation against the Republicans, the party that dominated Congress when the Taft-Hartley labor law was enacted?

Still another question that comes to the minds of analysts is, "How can a union claim a right to force an employer to forego his rights under the law?"

What appears to be an answer to that question is a report the National Labor Relations Board officials believe contract clauses designed to circumvent provisions of the Taft-Hartley law will not be enforceable in court. An NLRB spokesman said the feeling at NLRB headquarters is that no two parties can get together and contract away a public right.

To appraise the adequacy of the new labor law, the Joint Congressional Committee to Study Labor-Management Relations will look into the labor history of 20 employers—10 with "good" and 10 with "bad" labor records. As a result, the committee hopes to be prepared to introduce such additional labor legislation as may be needed when Congress convenes for the 1949 regular session.

Title to 92,000 Machine Tools Given Services

Control of JANMAT-tagged machine tools passes from WAA to Army and Navy, who may now store or sell them

WASHINGTON

COMPLAINTS that regional offices of War Assets Administration are still not following effective policies in selling surplus government-owned machine tools continue to be received by the Surplus Property Subcommittee of the Senate Committee on Expenditures; however, it now appears unlikely the subcommittee will hold the hearings on machine tool disposal which it planned to conduct during the summer.

One reason is the recent passage by both houses of Congress of S. 1198, which authorizes the armed services to take and retain title to stand-by machine tools—estimated as approximately 92,000 in number—so that all tools bearing JANMAT tags now are definitely off the market as far as WAA is concerned. Previously there had been doubts as to whether WAA was warranted in postponing sales of these tools which the War and Navy departments wanted to keep for stand-by purposes in event of a national emergency.

Disposal Program May Be Affected

Top WAA officials are re-examining the whole machine tool disposal program in view of the congressional action. The services, too, are surveying their anticipated needs in event of another war and will determine which of the tools they will want to keep and which they will offer for sale. Because of the heavy cost of preparing the tools for storage and shipping them to suitable warehouses, the services will retain no more than their minimum needs.

Another reason for calling off the summer machine tool disposal hearings is that the subcommittee chairman, Sen. Homer Ferguson (Rep., Mich.), is fully occupied in the examination of the Kaiser-Hughes flying boat contract and other matters as a member of the Senate Committee for Investigating the National Defense.

Although enactment of S. 1198 takes the 92,000 machine tools off the hands of WAA, it does not eliminate the possibility of their sale in the domestic market. Indications are that most of them will be dismantled, preserved in grease, packed and warehoused; however, the services will look carefully at their reduced appropriations and at the cost of holding the tools in standby before they determine to keep all of them.

In addition to giving the services title to the $828 million worth of machine tools, the act also gives the two services authority to lease 77 key war plants to private operators with the stipulation that they be kept in readiness for recapture by the services and resumption of war production at short notice. These plants cost the government $462 million, bringing the total cost of facilities and tools to $1,290 million.

OVERSEAS COMMITTEE: Arrangements for foreign machine tool men visiting the National Machine Tool Show in Chicago, Sept. 17-26, will be made by the overseas committee, members of which are shown above. Left to right, sitting: L. D. McDonald, vice president, Warner & Swasey Co.; A. S. Keller, foreign sales committee chairman, and vice president, Pratt & Whitney; Donald M. Pattison, dinner committee chairman, and sales manager, Warner & Swasey Co.; James C. Hebert, general sales manager, Jones & Lamson Machine Co.; Ray F. Ingram, vice president, Landis Tool Co. Standing: Tell Berna, general manager, National Machine Tool Builders' Association; Alan E. Stubbs, foreign sales manager, Bryant Chucking Grinder Co.; George Gorton III, vice president, George Gorton Machine Co.; Albert E. Henn, machinery sales manager, National Acme Co.

Cleveland WAA Office Aids Dealers in Selling Tools

With War Assets Administration's largest inventory of surplus machine tools located in the Cleveland region, special efforts are being made by Director James H. Frier Jr. to acquaint machine tool dealers with a "one-stop" service which has been inaugurated in the area to assist dealers not only in buying from WAA but also in selling the equipment they acquire.

The new service soon will have tabulated an estimated $100 million worth of surplus equipment and will have a verified inventory for each location where sales are to be held. It will further have a check system to advise customers on the availability of their orders and will provide a faster method for payment and delivery of equipment.

New York fob Price Set Up For Diamond Punch Presses

Diamond Machine Tool Co., Los Angeles, has instituted a new sales policy on its line of punch presses which will reduce the price of tools in eastern markets. Effective July 30 the company began selling its presses fob Los Angeles and New York. Previously it had sold only on an fob Los Angeles basis. Plans are being made to store tools shipped by water to the East Coast in a warehouse in New York.

The company makes punch presses of 9, 14, 30 and 31-ton capacities.

Mexican Machinery Group Asks for Sales Monopoly

Under a proposal advanced by the Mexican Association of Machinery Importers, a group which claims to represent 90 per cent of the country's machinery dealers, all government purchases of machinery and related items in Mexico would be made through the association, according to a report to the Department of Commerce.

Association members have been adversely affected, it is said, by importation by non-member dealers of surplus property sold to them by WAA.

Automotive Industry Receives 26 Per Cent of Alloy Steel

Reports for 1946 also show greatest tonnage of stainless steel shipments go to converters and processors. Largest product delivery of alloy was in hot-rolled bars, while largest product shipment of stainless was in cold-rolled strip

TWENTY-SIX per cent of all shipments of alloy steel in 1946 went to the automotive industry, according to an annual report just issued by the American Iron & Steel Institute, New York. The report covers 62 producers of alloy steel.

This percentage gave the auto industry 865,869 net tons of alloy steel products out of a net total of 3,325,122 tons, as is shown in the accompanying table. Of the 865,869 tons, 611,289 consisted of hot-rolled bars, this latter figure representing the largest total shipment of any product to any of the market classifications. Also, the shipment of hot-rolled bars was proportionately high to other consuming and market groups, with a result this product reached a higher total than any other alloy steel product and aggregated 1,339,189 net tons, 40 per cent of all shipments of alloy steel.

In second place among the consuming groups was the converting and processing classification. It received 793,730 net tons of alloy steel products, the bulk of them consisting of ingots, blooms, billets, slabs, sheet bars, seamless tube rounds and hot-rolled bars. Of the 793,730 tons, the converters and processors sent 251,563 tons on to members of the industry for conversion into further finished products, or for resale.

Fourth largest shipment of a product to a consuming group was 266,864 tons of hot-rolled sheets to the electrical machinery and equipment classification.

Among the high-ranking groups in tonnage of alloy steel received were: Third place, machinery, industrial equipment and tools; fourth, electrical machinery and equipment; fifth, jobbers, dealers and distributors; and sixth, rail transportation.

The various market groups combined under the heading of unclassified received a total of 402,837 net tons out of the net total of 3,325,122 tons of alloy steel shipped in 1946. Exports accounted for 96,328 net tons.

The institute's annual report on shipments of stainless steel products in 1946 shows that of a net movement of 293,876 tons, the greatest tonnage to classified groups went to converters and processors, their receipts amounting to 99,599 net tons. However, they forwarded 83,717 tons to members of the industry for conversion into further finished products, or for resale. The institute report covers 34 producers of stainless.

In second place in receipts of stainless steel were jobbers, dealers and distributors, whose total was 57,326 tons. Other high-ranking groups in the receipts of stainless were: Third place, automotive, excluding tractors; fourth, appliances, utensils and cutlery; fifth, machinery, industrial equipment and tools; and sixth, domestic and commercial equipment other than appliances, utensils and cutlery.

Market groups combined under "unclassified" received shipments of stainless totaling 81,655 net tons. Exports totaled 8736 net tons.

Largest product shipment of stainless was that of cold-rolled strip, which accounted for 95,821 net tons, or 32 per cent of all stainless shipments. Other products ranking high in net total shipments were: Cold-rolled sheets, 71,800 net tons; hot-rolled sheets, 30,469; hot-rolled bars, 29,675; and cold-finished bars, 22,283.

Other than 68,441 net tons of ingots, blooms, billets, slabs, sheet bars and seamless tube rounds shipped to converters and processors, the largest shipment of any stainless steel product to a consuming group was 30,364 net tons of cold-rolled strip to the auto industry.

Carnegie-Illinois To Supply Special Hot-Rolled Alloy Bars

Carnegie-Illinois Steel Corp., Pittsburgh, has announced that it is prepared to meet, with reasonable limitations, a demand for hot-rolled alloy steel bars

Distribution of Alloy Steel Products by Market Classifications

(Net Tons)

Market Classification	Semifinished Steel	Wire Rods	Structural Shapes	Plates	Hot Rolled Bars	Cold Finished Bars	Tool Steel Bars	Mechanical Tubing: Seamless	Mechanical Tubing: Pressure	Drawn Wire	Hot Rolled Sheets	Cold Rolled Sheets
Converting and Processing	306,307	5,145	6	50,212	372,900	12,987	985	6,712	3,542	9,510	4,737	1,183
Jobbers, Dealers, Distributors	4,806	....	1,153	9,049	77,681	25,296	10,075	65,781	4,682	511	18,024	7,370
Construction, Maintenance	149	29	1,935	4,376	6,211	342	2	10,327	799	....	3,326	2,193
Contractors' Products	667	....	873	559	1,721	184	82	663	22	....	10,958	11,229
Automotive, excl. Tractors	20,239	218	2,597	7,659	611,289	34,613	967	4,356	4,699	2,835	92,120	61,733
Rail Transportation	2,776	....	22,344	40,187	21,076	725	141	748	241	32	42,407	5,948
Shipbuilding	367	....	24	901	4,350	704	81	94	13	....	209	82
Aircraft	1,853	....	....	1,743	1,895	2,043	81	1,672	255	63	1,579	52
Oil, Gas Drilling	15,121	....	256	81	45,736	1,734	14	14,974	412	....	160	4
Mining, Quarrying, Lumbering	686	....	358	1,511	5,675	1,090	575	307	....	....	756	4
Agricultural	2,223	....	265	916	14,804	4,100	84	81	559	342	2,752	1,015
Machinery, Industrial Equipment, Tools	20,138	27	6,485	35,376	144,860	51,876	9,590	93,109	2,858	1,926	11,772	1,624
Elec. Mach., Equipment	932	....	....	551	12,644	1,765	286	17	12	15	266,864	45,523
Appliances, Utensils, Cutlery	277	..	11	87	1,178	461	84	13	69	4	6,020	21,476
Other Domestic, Commercial Equipment	55	....	117	84	1,987	2,338	547	845	22	176	4,756	21,827
Containers	6,665	....	....	1,149	234	....	19	....	....	19	3,775	2,474
Ordnance, other Military	698	....	....	274	584	272	60	31	11	....	138	63
Unclassified	57,550	1,434	....	6,459	111,549	25,538	38,858	45,487	1,564	9,474	74,027	2,563
Export	2,160	4	906	5,478	39,935	358	....	15,884	293	2	26,491	2,443
Total	443,669	6,857	37,330	166,652	1,476,309	166,426	62,531	261,101	20,053	24,909	570,871	188,806
*Less shipment to members of industry for conversion	84,417	1,806	....	6,560	137,120	1,274	463	4,362	575	652	7,561	....
Net Total	359,252	5,051	37,330	160,092	1,339,189	165,152	62,068	256,739	19,478	24,257	563,310	188,806

* All of these shipments were made to the group classified as "Converting and Processing."

with hardening characteristics more restricted than in standard specifications. Because of the closer metallurgical control in manufacture, the corporation said, specification of the restricted range steels will entail a price extra amounting to 10 per cent of the net for grade.

U. S. Steel Products Co. Contemplates Plant Addition

United States Steel Products Co., Chicago, has completed plans for a 32,000-sq-ft addition to its plant near Dolton, Ill., Robert W. McClendon, district manager of this U. S. Steel subsidiary, has announced.

Four new buildings are to be added to the existing plant, plus added warehouse space both for storage of sheet metal and other raw materials and for handling and mixing of paints.

Chicago's 1947 Industrial Projects Match 1946 Volume

Industrial developments in the Chicago area thus far this year have kept pace with the record peacetime volume of 1946, according to the industrial department, Chicago Association of Commerce and Industry.

During the first seven months of this year 227 projects have been announced, consisting of new construction and expansion of industrial facilities and acquisitions of lands and buildings. Total expenditure for all developments has amounted to $106,093,000 this year. In the same period of 1946 there were 211 projects valued at $109,270,000.

During 1946

Hot Rolled Strip	Cold Rolled Strip	All Other Alloy Products	Total (All Products)
10,039	3,823	5,642	793,730
472	444	1,075	226,419
9,768	962	63	40,482
130	729	13,804	41,621
15,781	6,187	576	865,869
1,878	259	839	139,601
....	....	172	6,997
89	240	51	11,616
118	....	1	78,611
30	....	81	11,073
374	....	19	27,534
4,010	2,842	1,027	387,520
36	28,904	14	357,563
287	4,180	49	34,196
944	4,312	13	38,023
65	....	35	14,435
95	....	4	2,230
193	5.202	22,939	402,837
68	1,762	549	96,328
44,372	59,846	46,953	3,576,685
5,399	212	1,162	251,563
38,973	59,634	45,791	3,325,122

E. G. Grace Refutes Charge Steel Facilities Expansion Inadequate

Chairman of Bethlehem Steel Corp. points to heavy expenditures for additional plant since end of the war and to delays in construction occasioned by strikes and slowdowns. Says industry's policy is to keep ahead of demand

REFUTING charges that the steel industry was remiss in not supplying greater capacity to meet current steel demands, Eugene G. Grace, chairman, Bethlehem Steel Corp., pointed recently to heavy expenditures authorized by the industry for expansion since the war and to delays beyond its control in getting this work along. He emphasized also losses in production at existing facilities because of strikes and slowdowns—more than 12 million tons of steel were lost last year alone because of these difficulties.

In 1945, he said, the industry spent $148 million for expansion; last year $291 million; and this year, according to estimates, will spend about $500 million. This work, he indicated, along with present facilities, should much more than take care of any reasonable demand for steel; and much more of it would be in operation today were it not for unexpected delays in equipment and materials, many of which can be directly traced to labor disturbances. Flat rolled products have been in especially stringent demand. Yet increases in flat-rolled producing facilities have been seriously retarded because of these circumstances.

Mr. Grace said the policy of the industry over the years has been to keep ahead of demand. He pointed out that in the 20 years, beginning with 1922, there hadn't been a single year in which demand had fully taxed capacity. Even in the boom year 1929, he said, production amounted to no more than 88.5 per cent.

Various charges today of an actual steel shortage were unwarranted, he thought. He cited the car building program, declaring emphatically that the car shortage was not due to a shortage of steel. In fact, he said it was his belief that some carbuilders were going to "shut off" on shipments of steel, as they now were receiving more than they can handle. He said that steel producers this year had promised Washington they would allocate sufficient tonnage to enable carbuilders to meet certain given schedules, and that they had more than kept their bargain. At present, he said carbuilders are turning out no more than 5500 cars per month, although schedules were set up for an output of 10,000 cars per month by this time.

He also thought that the steel industry should not be called upon to expand to meet various temporary and artificial demands; nor did he think it should be called upon to build up capacity to take care of the rehabilitation of Europe for a few years. Expeditious handling of the present expansion program, along with a continued period of sustained high steel production, would take care of all reasonable domestic needs, and still leave a reasonable margin for export.

Bethlehem spent $29 million for improvements and expansion in the second quarter, bringing the total for the first six months up to $53 million. The corporation will spend an additional $132 million to complete its present program. Interestingly, Mr. Grace said that Bethlehem had to add $9 million to expansion costs in the last quarter to meet the 15 per cent wage increase alone.

Bethlehem's payroll in the second quarter was $108 million against $101 million in the first quarter and $101 million in the second quarter of last year; number of employees was 141,500, against 140,400 and 147,100, respectively. Earnings per hour in the last quarter reached a new peak for the company of $1.592, against $1.486 in the preceding quarter.

Commenting on shipbuilding, he said that present prospects are that by the end of this year nearly all of the ways in the American yards will be empty.

Inland Lights New Blast Furnace at Indiana Harbor

Inland Steel Co. has for the first time lighted its blast furnace "A" at Indiana Harbor, Ind. This furnace is one of two stacks of 427,000 tons annual capacity built by the government during the war and acquired by Inland last October after the DPC plant was declared surplus.

The other stack, furnace "B", was blown in as soon as completed Nov. 15, 1943, but because the war needs for iron were met, construction of "A" facility was suspended. During recent months Inland completed the construction work.

With this addition, Inland now has eight blast furnaces with annual capacity of 2,502,000 tons. Seven of the furnaces are operating currently; the company's No. 3 went down Aug. 1 for repairs to require six or seven weeks.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Steel shortage likely to become issue in 1948 national elections. Democrats pushing for production capacity expansion. Senator Murray suggests government should build plants if private industry does not

REPUBLICAN leaders in Congress are beginning to fear that the steel shortage, if it continues to be felt that long, may be an important factor in winning votes for the Democrats in the 1948 elections. That is one of the reasons why Sen. Edward Martin (Rep., Pa.) has arranged to hold a conference with steel industry leaders about the middle of August.

Some of the Democrats, falling in with the CIO argument, are accusing the steel industry of working against the common good by seeking high prices and profits based on an economy of scarcity which will, incidentally, generate a lot of unemployment. They are accusing the Republicans of failure to protect the country against such a steel policy.

The steel attitude is based on long years of experience—that the present huge demand for steel is due to the vacuum created by wartime shortages for civilian purposes, that when the backlog demand has been filled the normal demands will be considerably less than at present, and that it therefore would be unwise to expand present capacity, particularly in view of the present high level of construction costs.

Republican leaders feel this argument lacks political sex appeal in the face of the Democratic argument that the nation wants nothing less than full employment, that it needs more steel than it now is getting to sustain full employment—and what are we waiting for? To rebut this argument, Senator Martin needs something more than the explanation that the present steel supply will be adequate when demands are smaller than at present, when business is less brisk, and employment is at a reduced rate.

Taking no account whatever of ordinary business considerations, of the necessity for businessmen and investors to plan realistically if they are going to stay in business, that experienced campaigner, Sen. James E. Murray (Dem., Mont.), has built up on the basis of the steel shortages a new variation of that old theme —the "full dinner pail." For a full dinner pail, contends Senator Murray, we need more steel—so let's have more steel.

The nub of a long speech recently made by Senator Murray on this subject is this: "If the industry fails to expand, or if it contracts to 80 million tons, as has been suggested by some steel producers, we shall be at least 10 million to 20 million tons short of what our economy needs to work at high levels. This, according to the record of unemployment in the 1920s and 1930s, means that industrial production and recovery would be held back and as many as 20 per cent of the necessary job opportunities would not be available. Ten to 12 million people out of a total of around 60 million would be idle.

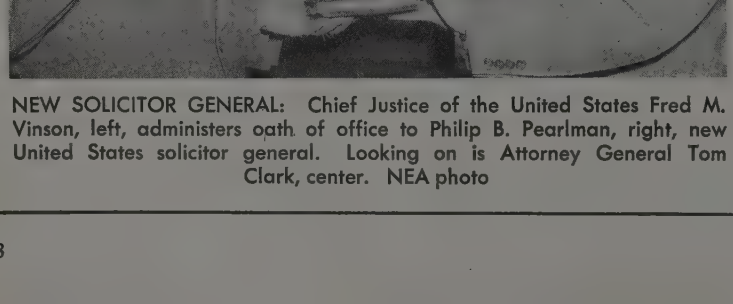
"If the leaders in the steel industry can take this prospect of mass unemployment without being greatly concerned, the public and the Congress of the United States cannot. A nation that adopted the Employment Act of 1946 as an instrument of national policy will not again accept depression conditions as a basis for industrial policy or decisions of the steel industry."

States Possible Party Stand

Senator Murray's remarks cannot be viewed simply as those of a veteran New Dealer. The indications are that he is paving the way for an argument that will be advanced by President Truman and his supporters. Apparently with White House approval, the President's Council of Economic Advisers has agreed to make a special study of the steel supply-demand situation and report on it well before the end of the year. If this plan materializes, as now conceived, then President Truman can be expected to devote part of his January economic report to the steel situation and its effects.

The Murray argument is that: "It is not sufficient for leaders of industry to say that uncertainty of future demand makes expansion unwise. That is tantamount to an abdication of the basic function of industrial leaders in our free competitive enterprise system. If industrial leaders are unable or unwilling to take risks involved in expanding the productive facilities required by a growing population whose living standards are bound to continue to rise, some other assurances for maintaining an expanding economy must be devised.

"In the event unaided private capital is unequal to the expansion, or unwilling to make it, I suggest the use by private industrialists of public funds from a government lending agency on such terms and conditions as would insure the most rapid development of the needed additional capacity. . . . As a last alternative, (I would favor) the use of public funds and construction of a government-owned

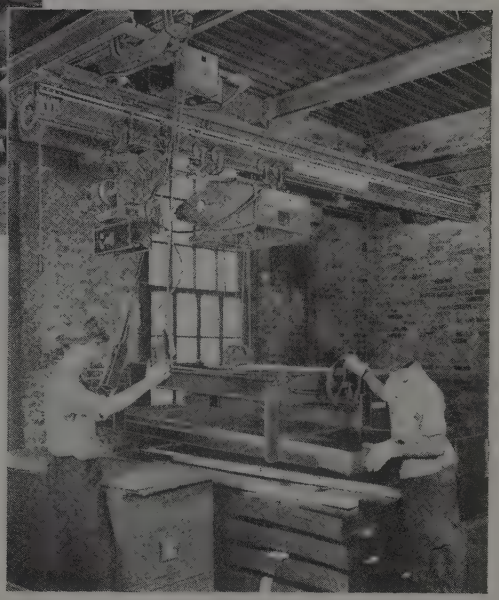


NEW SOLICITOR GENERAL: Chief Justice of the United States Fred M. Vinson, left, administers oath of office to Philip B. Pearlman, right, new United States solicitor general. Looking on is Attorney General Tom Clark, center. NEA photo

HANDLING STEEL

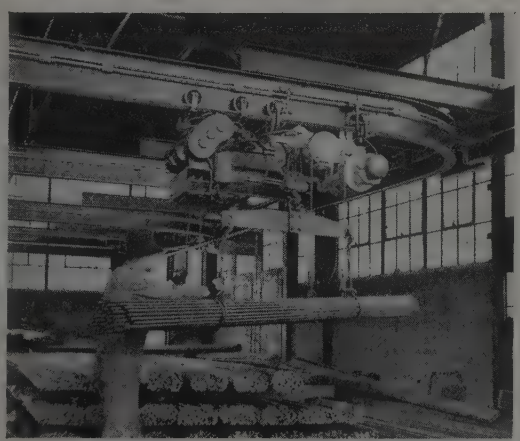
The Easy Way!

Power operated unit unloads steel by pushbutton control



Electric hoist with special hook, handles coils to process.

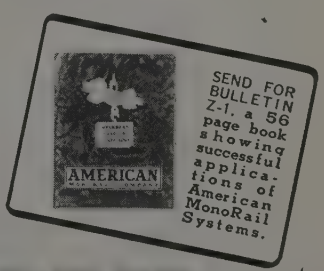
Power crane accurately spots 2-ton loads.



MonoTractor and 3-Ton hoist moves bar stock.

This tough job is made easy from start to finish —unloading stock from truck, to storage, to machines, to shipping—American MonoRail Systems, to fit any budget, afford faster handling, accurate spotting, reduced fatigue, added safety and greatly reduced damage.

American MonoRail Equipment saves one company $20 on every truck unloaded; another saved $150 in the first four months. With thousands of installations to draw from, American MonoRail Engineers are well qualified to offer solutions involving overhead handling equipment. This service is offered without obligation.



THE AMERICAN MONORAIL COMPANY

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steel plant to be leased for private operation."

This program has been incorporated in a bill which Senator Murray will polish up after the President's Council of Economic Advisers has made its report, and drop into the Senate hopper next January.

During the summer, efforts will be made to win support for this bill in the 11 western states that are trying so hard to industrialize their economies. In his speech, made in the Senate on June 24, Senator Murray quoted Walther Mathesius of the Geneva Steel Co. as advising Idaho businessmen as follows: "For the near future, the continuing steel shortage not only in the western market but in steel markets generally will act as a definite deterrent to the establishment of fabricating plants in the intermountain area."

"The announcement by the Steel corporation that it is unwilling to take steps to insure the development of the West amply confirms the fears of those of us who declared our opposition to the sale of the Geneva steel plant to this great monopoly," declared Senator Murray.

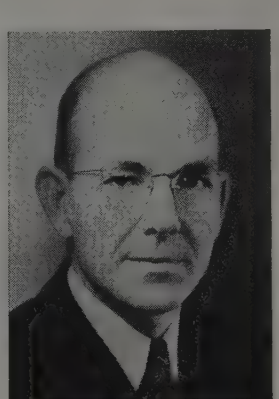
This is the situation which Senator Martin will have in mind when he meets with steel industry spokesmen the middle of August. He is particularly concerned because, as chairman of the Senate Small Business Committee's Subcommittee on Steel, he has acted as the agent for the Senate as a whole in looking into the steel situation. Every member of the Congress has received daily one or more complaints that the steel shortage is causing hardships among his constituents.

In the Senate these complaints have been routed to Mr. Martin's subcommittee; hundreds of them come in the inter-office mail each morning. Senator Martin does not think it politically expedient to tell the Senate that everything is going to be all right—when demands fall off so that the steel supply will go round. He, like other Republican leaders, is sold on the idea that business and employment must be kept at high levels, that we must have an expanding economy, and that we must avoid the major depression that usually follows in the wake of a war. In the position in which he finds himself, he feels he has not yet gotten the final helpful answer in his steel investigation.

Bureau of Mines' Changes

In the absence of Senate action on the President's nomination of Dr. James Boyd as director of the Bureau of Mines, Thomas H. Miller has been appointed acting director of the bureau. Mr. Miller became assistant director last November and has been with the Bureau of Mines in economic and statistical work for nearly 20 years. Dr. Boyd, whose confirmation was opposed by John L. Lewis, continues in his former position of special assistant to the Secretary of the Interior.

Dr. R. R. Sayers, who recently resigned as director and went back with the U. S. Public Health Service, has been granted a leave of absence from the latter to become chairman of the medical board, United Mine Workers' Welfare & Retirement Fund, by selection of the three trustees, Ezra Van Horn, Thomas Murray and Mr. Lewis.



THOMAS H. MILLER

Wage-Hour Exemptions

While no date yet has been set, the Wage & Hour Administration definitely has decided to hold hearings this fall on the present rules governing exemptions from the overtime provisions of the Fair Labor Standards Act of 1938. In view of the opinions expressed at a recent closed meeting with representatives of employers and labor unions, there will be considerable sharp controversy at the hearings over proposed revisions. Many industry representatives in Washington are keeping close watch on this situation and advising their members.

Just where the demand for revisions originated is not revealed by the Wage & Hour Administration. However, the administration contends that its field men are having increasing difficulty in applying the rules to current applications for exemptions. In view of the big wage increases in 1946 and 1947, they say, there now is little meaning in the rule under which, to be exempted, an "executive" employee must receive not less than $30 a week and an "administrative" employee not less than $200 a month. At the recent closed meeting CIO union spokesmen contended that the limit for exemption should be no less than $500 a month under present conditions; such an increase, of course, would put additional employees in the union collective bargaining process.

Box Car Shortage

Sen. Clyde M. Reed (Rep., Kan.) told news reporters, after his closed meeting with representatives of the steel companies, the railroads and the car builders on July 31, that he felt more optimistic about the prospects for increased production of box cars. The meeting was called when the senator received advance figures indicating a drop in production in July as compared with June.

The main reason, the meeting disclosed, was an unbalanced inventory condition at car building plants. J. Monroe Johnson, as director of the Office of Defense Transportation, agreed to act as co-ordinator; he will issue instructions whereby excess stocks of parts at one or more plants will be shifted to others in need of them.

Steel men told Senator Reed that by September they will have reached the goal, set up last February, of supplying enough steel to permit construction of 10,000 box cars a month.

As as result of the meeting, Senator Reed felt that the box car shortage will have been eliminated in time to meet shipping demands next year.

No Business Census in 1948

The economy drive prevented House approval of H. R. 1821—so that there now is little likelihood of a Census of Business in 1948. The task would have required the expenditure of around $14,500,000. The census was approved by the Senate and was not killed in the House; there the bill was passed over without prejudice, so that it can be called up at the next session.

However, it would take a lot of time to organize for such a census. The Census Bureau would have to work with some 3 million social security cards. It would have to check with the Treasury Department to get correct addresses of some millions of businessmen and business firms. It would have to organize a special field force of 8000 competent people.

Because of the widespread demand for such a census it probably eventually will be authorized. It is needed to show wholesale and retail sales for the nation by product groups and by areas. It would show employment and payrolls in different lines of business, and operating expenses. The census would be taken every two years. In short, it would provide basic information of great value to many business houses in helping them to steer their activities along sound lines.

Three Armed Services To Procure Needs Independent of Each Other

Procurement policy under new National Security Act made clear in statements by President Truman and Defense Secretary Forrestal. Purchasing functions of Army, Navy and Air Force kept separate

THE THREE armed forces of the United States, under the new National Security Act of 1947, will continue to conduct procurement independently of each other. This was made clear by President Truman's first executive order to implement the new law, and by remarks of James V. Forrestal in his first press conference as the nation's first Secretary of Defense.

The executive order like the new law has separate sections for designating the functions, respectively, of the Army, Navy and Air Force. The first duty of each is "to organize, train and equip" "land forces," "naval forces," and "air forces."

Secretary Forrestal said emphatically that each of the three equal branches would have its own operating organization and that in his capacity as defense secretary it would be his duty to obtain proper co-ordination and see to it that the units composing—in the language of the new act—the "National Military Establishment" operate efficiently.

To Develop Own Weapons

Each branch, by the President's order and the law, is given the undivided responsibility of developing its own weapons, tactics, techniques, but is enjoined to co-ordinate with the other two in such programs. In harmony with the new law, the Navy is given a definite mandate to maintain the Marine Corps, which will do its own procuring and conduct its own development and research work. It also gives an unqualified mandate under which the Navy is to operate its own air reconnaissance and provide its own air transport, merely co-ordinating its techniques, tactics, procurement and development with similar work of the Air Force.

Mr. Forrestal said it would take some time to put the new law into complete operation. The immediate problem, he said, is to find men for the new posts, especially for the new Central Intelligence Agency and the National Resources Board. There should be no complications about organizing the new Munitions Board which is the new name for the Joint Army & Navy Munitions Board.

From the standpoint of industry, an important new unit will be the Research & Development Board which will constantly scrutinize research and development activities of the three services. The result, it is expected, will be a greater degree of co-ordination of these programs, and a stepping up of their tempo.

Coincidental with the enactment of the new setup, the separate services have made some further moves away from wartime procurement procedure. In particular, the Navy and Marine Corps have re-instituted the old bid system of purchase which was interrupted when the War Production Board in 1942, by Directive No. 2, made it mandatory to let contracts by negotiation. The practice again is to advertise for bids, open and read them publicly at a time and place designated beforehand, and furnish to interested bidders copies of competitors' complete bids when this is desired. The Navy's Bureau of Supplies & Accounts, in announcing this return to old-time methods, has asked suppliers to comment on this move, and voice any suggestions.

There will be two exceptions. First, public openings will continue taboo on purchases of armor plate and many other items in a restricted list. Second, while the period of scarcities continues, scarce commodities will be ordered as a result of negotiation. For instance, the Navy is badly in need of a number of steel items, particularly sheets and concrete reinforcing bars, and will place tonnage where it can with an escalator clause permitting price adjustments up to 20 per cent of the dollar value of the original order.

The War Department has resumed, as far as possible, its policy of buying in small quantities, on the basis of public competitive bids, through its Engineer and Quartermaster offices located throughout United States territory.

Only one government procurement agency continues to buy, as a matter of policy, on the basis of negotiation—the Maritime Commission. Another, the Panama Canal, has returned to the old policy of advertising for bids, but unlike the Army and Navy, is disclosing no information about bids until after the contracts have been awarded.

WAA's New York Region Has New Sales Offerings

New surplus property sales offerings in the New York region, with closing dates in August, include varied marine equipment, locomotives, tanks and steam specialties, automotive vehicles and maintenance equipment, gasoline and diesel powered generators, machine tools, electrical equipment and many other items, WAA Regional Director Carl P. Malmstrom reports.

Fresh listings bring the current regional total of scheduled sales programs to 160, with an overall acquisition cost value of almost $148 million.

Three fixed price sales of marine equipment include over $700,000 worth of navigation instruments and other gear. Several switching and industrial type locomotives are included in two other fixed price sales with prices ranging from $1200 to $6000. Automotive vehicles, replacement parts and maintenance equipment, with a total cost value of over $1 million, are included in a fixed price sale and two sealed bid offerings.

Both used and unused generators, ranging from small sets at $100 to diesel powered plants priced at $31,000, are listed in two fixed price sales. Currently underway is a continuous fixed price sale of $5,776,000 worth of machine tools at two WAA disposal centers in Buffalo and Rochester, N. Y.

Large, varied inventories of electrical equipment, thermal pipe covering, aluminum shapes, foundry equipment, compressed gas cylinders, wire, cable, and $158,000 worth of assorted paints and lacquers, incandescent and neon lamps and carbon steel tubing are also available.

Army and Navy Project Set up for Atomic Energy

The War and Navy Departments announce the approval by General Eisenhower and Admiral Nimitz of a program and plan of operation for the Armed Forces Special Weapons Project.

This project has been established as a joint Army-Navy organization which will discharge all military service functions relating to atomic energy. It has assumed the responsibility of carrying on those military service functions of the Manhattan Project which were retained under control of the armed forces at the time of turnover of the Manhattan Project to the Atomic Energy Commission.

WAA To Lease $14 Million B-29 Plant in Renton, Wash.

War Assets Administration has announced that the $14 million B-29 and B-50 plant at Renton, Wash., operated during the war by Boeing Aircraft Corp., is for lease on a one-to-four-year basis.

Situated on a 91-acre site, the facility has 12 rentable buildings which contain approximately 2 million sq ft of floor area.

Substantial Portion of British Steel Expansion Plans Approved

Iron & Steel Board gives go ahead signal on projects totaling $500 million. Includes expansion in steelmaking, blast furnace and rolling mill capacity. Program contemplates scrapping of some obsolete facilities

LONDON

PROGRESS in the British iron and steel industry's $672 million development program is reported in the monthly statistical bulletin of the Iron & Steel Federation. To date, plans totaling $560 million have been worked out in detail by the industry and submitted to the Iron & Steel Board, which was appointed last October to supervise the program. Approval in detail has been given to plans totaling $360 million.

Certain other plans have been approved in general by the board, but some details remain to be ironed out before a definite start can be made. These bring the total having overall board approval to about $500 million. The remainder of the proposal still is under consideration.

The original program was formulated in May, 1946, and called for the starting of the various programs over a period of five years and completion in 7½ years.

In estimating the extent to which the plan has been submitted in detailed form for execution, the figure of the total expenditure on the schemes submitted of $560 million—in relation to the original estimated cost of the plan as a whole of $672 million—tends rather to overestimate the position. Actually about two-thirds of the capacity to be built under the plan has been put forward in definite schemes. The difference between the percentage in value terms and in the physical terms may of course be due either to variations in the schemes as they are worked out in detail, or to a rise in prices. As regards costs, an increase of about 20 per cent over the original estimates is forecast, and this would bring the overall cost of the schemes to about $800 million.

As regards the estimated increase of steel producing capacity, it is pointed out that the plans are associated with a large scrapping of existing plant, much of which has still a useful life of a number of years.

Steel Furnaces: On the steel furnace side, new building totaling 4,148,000 tons has been submitted for approval as against the total in the original plan of 5,835,000 tons. In addition, arrangements have been made to convert approximately one-third of the steel furnace capacity at present using producer coal to the use of liquid fuel. This will in general contribute to increased output from the plants as some offset to the increased cost of firing with fuel oil.

Among the principal plans already approved is the new steelworks at Margam in South Wales with steel furnaces designed to supply the new continuous strip mill, which will produce approximately one million tons a year of wide coiled strip as a basis for further continuous cold rolling into tin plate and sheet. Site preparation has already started and the first new blast furnace in connection with this plant came into operation at the end of 1946.

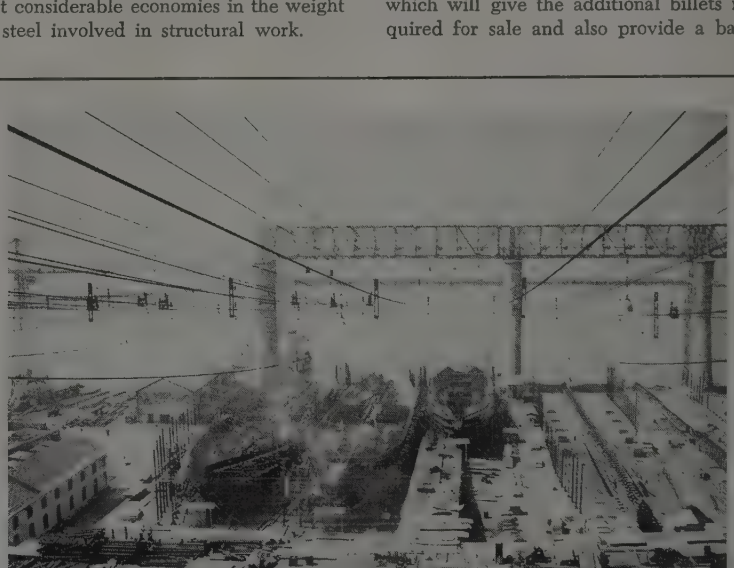
The scheme for a new steelworks at Dorman Long's on the Northeast coast has also been approved. This plant incorporates a universal beam mill to produce broad flange beams which will effect considerable economies in the weight of steel involved in structural work.

In Lincolnshire, extensions to the steel melting shop at Lysaghts have been approved, together with the scheme for the construction of a modern continuous billet mill producing 450,000 tons of billets a year. Considerable progress has already been made, both on the steel furnace and the blast furnace side, in expanding production in preparation for the installation of the new mill. A new melting shop at the Appleby-Frodingham works has been approved and construction is well advanced so that it should come into operation by the end of 1947. The modernization of the heavy section mills at these same works is also proceeding.

The rebuilding and enlarging of the Round Oak works, based essentially on the scrap arising in the Birmingham area, has already been started.

A scheme is under consideration by the board for the rebuilding and enlarging of the steelworks associated with the Summers continuous strip mill for sheet production at Shotton.

The proposed expansion of steel furnace capacity in Northamptonshire has been approved in its general lines. A scheme has been worked out by Stewarts & Lloyds involving the expansion of production at Corby by over 700,000 tons of steel, mainly basic bessemer quality, which will give the additional billets required for sale and also provide a basis



ITALY'S SHIPBUILDING REVIVING: Despite shortages of materials, trade restrictions, and currency exchange difficulties, the Ansaldo shipyards, near Genoa, Italy, are producing vessels for many European countries. The yards employ 7000 workers, 500 of whom are women. Above photo shows yards from the crane bridge, with two ships ordered by Scandinavian countries near completion. NEA photo

for the expansion of tube production, made particularly urgent by the growing export demands.

Blast Furnaces: Plans submitted provide for 2,775,000 tons of new capacity, compared with 4,750,000 tons in the original plan. Approved plans include the extensions in South Wales in connection with the new steelworks, the building of enlarged new furnaces at Lysaghts in Lincolnshire and the addition of two new large blast furnaces at the Appleby-Frodingham works of the United Steel Cos., to replace smaller units. These will be added to the two large modern furnaces completed at Appleby and provide a four-furnace unit. A third furnace has been approved at Consett on the Northeast Coast, which will be additional to the first modern furnace completed in 1942 and the second furnace which is expected to come into operation during the course of 1947. A third furnace is also being built at the Clyde Ironworks in Scotland which will enlarge the two-furnace plant completed at the beginning of the war. Blast furnace developments at Corby are associated with the new steelworks extensions.

Rolling Mills: In the case of billet mills, two programs for development on home ore fields, in Lincolnshire and Northamptonshire, have been approved. A scheme for the building of a new four-high plate mill, together with the concentration of the production at the Consett works on plates, has been submitted but not yet approved for immediate construction. Modernization at the Appleby-Frodingham works in Lincolnshire is proceeding. Modernization of the mills at the Round Oak Co. on medium sections is already under way. The scheme for the broad flange beam mill on the Northeast Coast, which is much the most important scheme in connection with the modernization of the production of heavy structural material, has been approved.

In the case of sheet and tin plates, the developments already referred to both in South Wales and Shotton have been approved. In the lighter mills, schemes have been approved for a new bar and rod mill integrated with the continuous billet mill in Lincolnshire and for further strip production at Corby. A rod mill at the works of Richard Johnson & Nephew has been approved and construction is already well advanced. The new window section mill at Darlington is coming into full operation. The plans for a new rod mill at the Lancashire Steel Corporation have been submitted. Schemes have also been approved for developments in other finishing sections of the industry, for example, in tubes, tires and wheels, wire and stainless steel.

Expect RFC Decision On Kaiser Steel Plant Refinancing Soon

Western States Council confers with Washington officials on proposal to write down government loan of approximately $100 million. Kaiser now seeking reduction in San Bernardino County, Calif., tax assessment

DECISION is expected soon on refinancing of Kaiser Co.'s Fontana steel mill in southern California.

Members of the Western States Council, headed by Louis B. Lundborg of the San Francisco Chamber of Commerce, recently returned from Washington where they conferred with officials of the Reconstruction Finance Corp., Attorney General Clark and congressmen regarding the mill.

Henry Kaiser has proposed that the government loan of approximately $100 million be written down on the same formula used in establishing the value of the Geneva Steel Co. mill when it was purchased from the government by U. S. Steel Corp. Roughly this would mean a writedown of about 80 per cent.

The Western States Council delegation was assured by Washington officials that the matter is being studied and efforts were being made to reach an early decision.

The Kaiser Co. last week asked San Bernardino County, Calif., for a reduction of $4,280,140 on a $13,375,000 tax assessment against the company's Fontana mill.

J. R. Walker, controller for the mill, told the San Bernardino board of supervisors sitting as a board of equalization that Assessor Max Cranmer had based his estimates on book values rather than on actual values.

Mr. Walker claimed the mill's value is less than indicated because it was erected during the war and received more wartime "write-off" than is the case with other properties.

The present assessment is 25 per cent higher than last year. Attorneys for the mill declared it "does not represent a true value of the Kaiser holdings." (According to California law county assessors fix a valuation figure of less than 50 per cent of "going market value" on taxable holdings.)

Consider Consolidated Sale

Proposed sale of Consolidated Steel Corp. to Columbia Steel Co. will be considered and voted on by stockholders of Consolidated at their annual meeting Aug. 29. At a meeting Mar. 3 sufficient proxies were received to approve the sale, but the meeting was adjourned without a final vote at that time because of an antitrust suit brought by the government to restrain the sale.

Westinghouse Builds Power Plant

Westinghouse Electric Corp. soon will begin manufacture of ten 5000 kw unit power plants at its Sunnyvale, Calif., plant. These new type "packaged" power plants, according to R. A. Neal, general manager of the company's West Coast operations, will greatly simplify installation of low cost electric plants. They will be completely self-contained units operating on either coal or oil and requiring only the addition of a building to house them.

Raise Western Steel Prices

Western steel producers have announced price increases on most products in line with the raise initiated by eastern mills. In general, western increases average higher than those made in the East.

Geneva Steel Co., subsidiary of U. S. Steel Corp., raised structural shapes, carbon and Manten plates $6 per ton and Corten plates $9 a ton. The new f.o.b. prices, per 100 pounds, at the Geneva mill are: Structural shapes $2.975; carbon plates $3.125; Corten plates $4.725; and Manten plates $4,225.

Columbia Steel Co., U. S. Steel Corp.'s West Coast subsidiary, increased prices at Pittsburg and Torrance mills 30 cents per 100 pounds ($6 a ton) on the following products: Structural plates, tie plates, hot-rolled bars, concrete reinforcing bars, hot-rolled sheets, hot-rolled annealed sheets, galvanized sheets, galvanized flat culvert copper steel sheets, well casing sheets and hot-rolled strip. Columbia also has increased prices on rods, nails and wire products 25 cents per 100, or $5 a ton.

Kaiser Co.'s mill at Fontana, Calif., also increased prices from $3 to $7 a ton. The advances are: Plates up $6 a ton; structural shapes $6; carbon merchant bars $6; alloy merchant bars $5; cold-rolled carbon bars $7; hot-rolled sheets $6; hot-rolled strip $6; carbon billets $3 and manufacturers' wire $5.

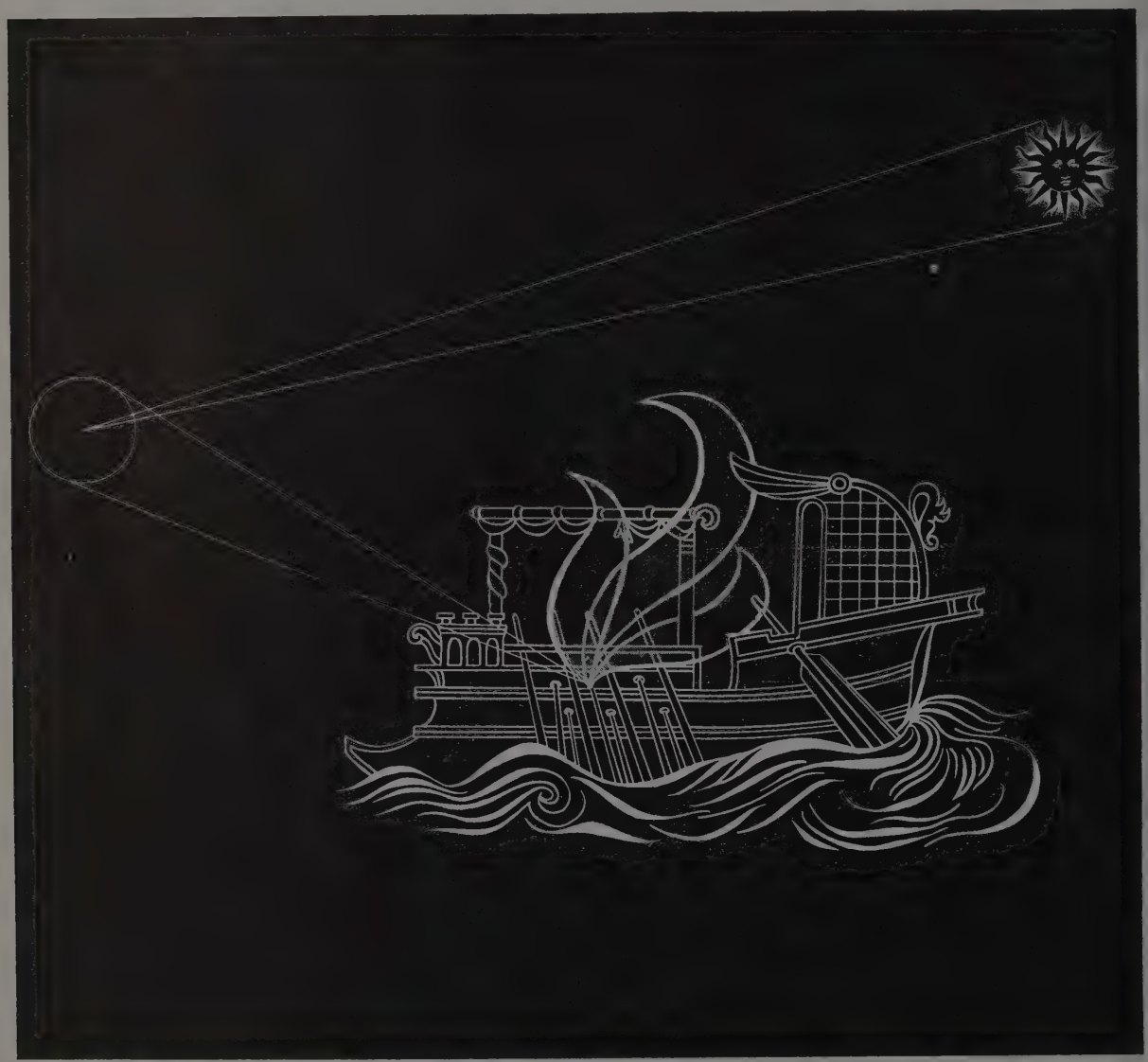
Bethlehem Pacific Coast Steel Corp., Bethlehem Steel Corp. subsidiary, increased prices an average of $5 a ton.

IT ISN'T DONE WITH MIRRORS—TODAY

When the Roman fleet tried an amphibious operation at Syracuse, they ran into a problem of high temperature condition that completely nonplussed them. Archimedes, according to legend, burned them up by focusing the sun's rays on them with mirrors.

Modern problems of operation at high temperatures are solved quite simply by using molybdenum steels. Their creep strength and excellent properties at elevated temperatures assure good performance when the heat is on.

We will be glad to send detailed information concerning the types of molybdenum steel suitable for operation at elevated temperatures.



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MOLY

Highway construction and maintenance, training of new drivers essential if automotive market is not to be stunted artificially. Parking facilities must be made available in congested areas at moderate prices

By GEORGE ROMNEY
Managing Director
Automobile Manufacturers Association

GUEST EDITOR

While STEEL's Detroit editor is on vacation, guest editors have been invited to contribute their views to Mirrors of Motordom. Mr. Romney, whose comment follows, directs activities of the Automobile Manufacturers Association, and in this capacity has done a most effective job over the past eight years.

GEORGE ROMNEY

IT IS a particular pleasure to accept the invitation of STEEL's Detroit editor to serve as a guest editor for this issue of "Mirrors of Motordom," because the steel and automobile industries confront some major highway transportation problems that will vitally affect their future sales and production.

The automobile and steel industries are closely interrelated. The automotive industry in normal times is the major customer for steel and steel products, having taken up to 24.5 per cent (1935) of the total tonnage of the industry. Future automotive markets and related steel markets will depend on vehicle use. It is total vehicle mileage that will determine vehicle sales and production and the size of steel's largest market. Yet with vehicle registrations still below prewar levels, a recent *New York Times* front-page story based on a nationwide survey was headlined "Cars Swamp Our Cities."

Producers Have Responsibility

Many industries have now reached the point where the producers have a responsibility to themselves and to the public beyond that of making a reliable product. That is to help make possible the full and proper use of their product, once it is sold.

The satisfied customer is the repeat customer. The manufacturer is going to have just as dissatisfied a customer on his hands if he sells a product the buyer finds difficulty in using as he would have by selling a shoddy product.

In the case of automobiles we have not reached a position where the product cannot be used. However, there is ample evidence that their use will become more and more restricted and difficult, lacking intensified, constructive efforts to dissolve growing barriers.

In the foregoing I do not mean to imply any approaching saturation of the market. Over the history of the automobile industry, forecasters have been guessing on when the market would be filled up, and not one has been anywhere near right. Entirely aside from the current pent-up demand brought on by the war, I foresee a continuing strong and expanding desire to own and use motor vehicles. But the market *can* be stunted artificially.

People still have need for more and more cars, but if barriers to car use keep intensifying, then our market cannot develop simply because there will be no place to drive or park those additional needed cars.

Important among the road blocks that stand as limiting factors on future sales of vehicles are antiquated highways, inadequate parking facilities, inadequate training of drivers, and high accident totals.

Problems in these areas are public problems. They are the primary responsibility of public officials—federal, state and local—and other public, civic or user groups. Nevertheless, industries whose products are important in providing highway transport facilities should give active support to those groups who carry the primary responsibility in these matters.

Most of the barriers to vehicle use have developed over a long period to their present acute proportions. The case of highway deficiencies is typical. In 1908, there was just one mile of modern improved hard surface interstate highway in the United States. That mile of road was just north of Detroit and is today a part of the city street system.

The one mile was the forerunner of the good roads movement which pulled the country out of the mud and has resulted today in 235,000 miles of primary federal aid highway system, which, together with secondary roads, comprises the greatest highway network in the world.

But that network was already becoming seriously antiquated before the war and the suspension of construction throughout the war years has brought us now face to face with a serious problem. The seriousness of this situation is emphasized by the fact that of the primary road mileage of the highest type, 42 per cent will wear out in the next ten years. A much larger per-

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	441,793	140,738
April	449,388	248,108
May	390,629	247,620
June	418,919	216,637
July	400,200*	331,100
August		359,111
September		342,969
October		410,510
November		380,664
December		380,908
12 ms.		3,268,456

* Preliminary.

Estimates for week ended:		
July 19	103,091	80,895
July 26	82,712	84,720
Aug. 2	94,408	79,385
Aug. 9	95,000	77,825

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centage is already inadequate in terms of present traffic volume.

The parking problem is as acute as the highway problem. Many parking lot sites are being blotted out by new building construction. In one city, Pittsburgh, a survey showed that as much as 17 per cent of the total vehicles on the downtown streets were cruisers looking for a space to park.

A car is of little use to a person unless he can drive near to his final destination and leave it, but in many cities conditions are so bad that curb parking is being banned. In short, there is no doubt that the traffic congestion and inadequate or too costly parking facilities discourage the use of automobiles and hence represent a threatening barrier to car sales.

The severity of these problems in terms of car use is illustrated by a survey made last year in Washington. Before the war 26 per cent of those entering the downtown area had traveled by automobile. That figure had shrunk to 15 per cent by 1946. Persons interviewed attributed the reduction to Washington's parking and congestion conditions, which are typical of most other American communities.

Driver Training Is Problem

Driver training or, more accurately, the lack of driver training, is another major barrier to the future vehicle and steel sales. Over the years as more and more people have reached driving age they have learned to drive cars on a hit-or-miss system, often resulting in highly unsafe habits.

More than 2 million youngsters annually reach legal driving age. About half become registered drivers but an insignificant percentage of these is adequately trained. Not over 300 of the 25,000 high schools in the nation have behind-the-wheel instruction for their students.

From the standpoint of automotive markets, this has resulted, significantly enough, in the fact that only 7,268,000 women are registered drivers today out of the 25,882,000 between the ages of 20 and 44. And this, incidentally, ties in with the major barrier presented by highway accidents and fatalities, for many women are not only untrained in driving but afraid to drive. On highway safety, the Public Roads Administration has made this significant observation: "No other structure made by man has a death rate as high as the highway."

In the last year, alone, 33,500 people died in traffic accidents and nearly a million more were injured. This is in spite of the fact that through constant emphasis on highway safety the groups working in the field have been able to report a decline in traffic fatalities from 18 deaths per 100 million miles in the 1930s, to 9.8 last year.

The solution of these problems is far more important than its immediate effect on our two industries. This is well stated in this paragraph from a California legislative report made following a two-year fact-finding investigation:

"Our agricultural, industrial and social structure bears the indelible imprint of the motor vehicle. The inefficiency of modern life, whether in business or recreation, is measured in terms of how long it takes to move from place to place; how much it costs in dollars and cents; and how much it costs in life, limb and personal exasperation."

The automobile, petroleum, rubber, automotive parts and other industries, in the public interest as well as in their own self-interest, are aggressively supporting those groups that are working to remove these barriers to a full, free, efficient and safe use of motor vehicles, which is so vital to the economy and the public at large. Proved programs have been developed. Their application throughout the country, before we complete the filling of the present pent-up demand resulting from the war, is imperative if we are to avoid the strangulating effects of these conditions.

The job is so big and so pressing that the President has provided the leadership in the development of a tested "Action Program" that has been adopted not only nationally but by every state. It needs and deserves the support of every citizen and particularly of every industry importantly affected by highway transportation. Such support can open the way to the kind of continuing, healthy progress and expansion in motor vehicle ownership and use during the next 20 years that occurred during the two decades between the world wars.

June New Car Registrations In 26 States Total 87,826

New car registrations for June from 26 states tabulated thus far total 87,826, the motor statistical division of R. L. Polk & Co., Detroit, has reported. New truck registrations from 30 states for June totaled 27,016 units, as compared with 20,084 units from the same states for June, 1946.

Final registration figures for May showed a total of 286,719 new passenger cars had been titled during the month and 76,901 new trucks.

Since the first of the year new truck registrations have run 62,477 units for January; 63,752 for February; 79,344 for March; 85,148 for April; dropping back slightly in May to the 76,901 figure. It is expected that for the first half of the year, when June truck registration tabulations are completed, that approximately 430,000 trucks will have been sold for the period (as reflected by the registration figures). For the first six months of 1946 total new truck registrations were only 231,068.

New passeenger car registrations, which have been at high levels, are expected to approximate 1,500,000 for the first six months of the year, it has been estimated.

Federal Aid for Highway Projects Tops Prewar Mark

Federal aid highway projects under construction as of April 30, 1947, totaled $462,325,147, compared with $251 million for the same period in 1941, the Public Roads Administration has reported.

In addition at that time, there had been contracts awarded but not started amounting to $90 million; plans approved but not under contract amounting to $162 million; and projects programmed only totaling $664 million.

States with large federal aid programs under construction include California with $50 million, Texas with $45 million, Pennsylvania with $25 million, Michigan with $17 million, New Jersey with $16 million and New York and Ohio with $15 million each.

Discounts Fears That U. S. May Import Most of Its Oil

Although there has been a gradual increase in imports of petroleum, it is not likely that the United States will ever have to import a major share of its needs, according to a recently released report entitled "United States Petroleum Import Prospects," published by the Department of Commerce and prepared by R. L. Trisko of the Fuels and Lubricants Section, Office of International Trade.

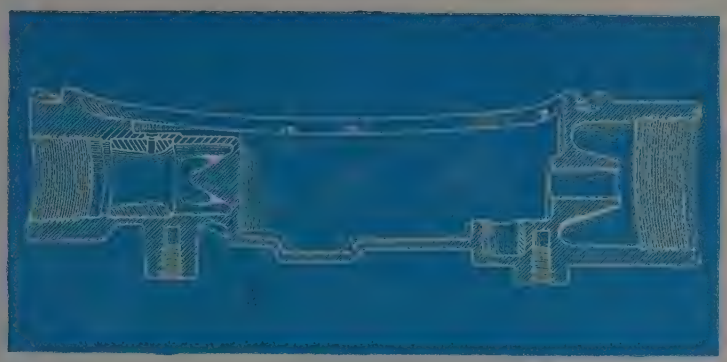
Mr. Trisko declares that, if domestic petroleum production were to become inadequate, the United States would be able to meet the deficit by manufacturing a sufficient volume of liquid fuels from non-petroleum sources.

Truck, Equipment Show Featured at Illinois Fair

A truck and special equipment show is one of the features of the Illinois State Fair now being held in Springfield, Ill., and scheduled to run until Aug. 17.

More than 2 million visitors are expected to view the display which will show special Dodge truck equipment developed for use on Illinois farms and in a large number of Illinois industries. Units in the display will include a four-wheel-drive truck with power take-off and many other models.

PRACTICAL CONSIDERATIONS IN DIE CASTING DESIGN



MINIMUM SECTION THICKNESS IS DESIRABLE

In designing die castings, sections should be of minimum thickness consistent with ease of casting and with adequate strength and stiffness. It is also desirable for sections to be as nearly uniform in thickness as possible, thereby avoiding unequal shrinkage stresses caused by uneven cooling during production.

Where heavy sections are required at certain points of a casting, the transition from thick to thin should be gradual rather than abrupt. A good example of this is the *zinc alloy* die cast governor body shown in cross section above. While the walls of this casting range from $\frac{1}{16}$ to more than $\frac{3}{8}$ in. thick, a gradual blending of sections is effected by the use of liberal fillets or tapers. The extra thickness at bosses helps to avoid localized stresses when the casting is assembled to other units.

Thin sections not only minimize weight but are stronger *in proportion to thickness* than heavier sections. Thin sections also cool rapidly in the dies, thereby increasing the rate of production and improving surface smoothness. While there is no point in specifying a section so thin that it will not meet service requirements, the use of excess thickness (beyond allowing a reasonable factor of safety) merely constitutes needless waste.

ALLOY SELECTION

The performance of all die castings is based on both good design and proper alloy selection. The *zinc alloys*, covered by specifications of both the American Society for Testing Materials and the Society of Automotive Engineers, can provide the mechanical properties given in the table below. Your die caster understands the necessity for careful control with respect to every element involved in alloy formulation to assure maximum mechanical properties and dimensional stability.

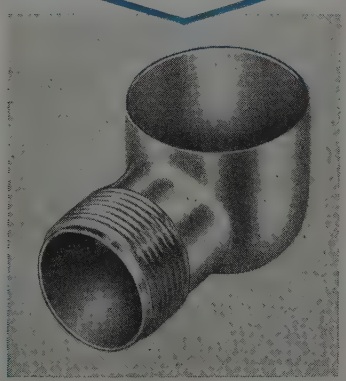
MECHANICAL PROPERTIES OF ZINC ALLOYS FOR DIE CASTING

PROPERTIES*	ZAMAK†-3 A.S.T.M.-XXIII S.A.E.-903	ZAMAK†-5 A.S.T.M.-XXV S.A.E.-925
Charpy Impact Strength Ft.Lb., ¼"x¼" Bar, as cast	43	48
Tensile Strength, Lbs./Sq. In.	41,000	47,600
Elongation, % in 2 In., as cast	10	7
Brinell Hardness	82	91

*Properties are as determined on the Zamak alloys. These values, as cast, are well above the minimum A.S.T.M. and S.A.E. requirements.

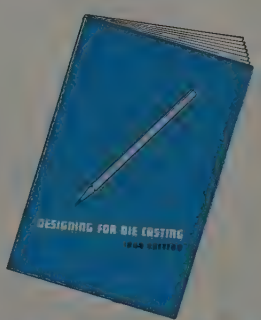
†A trade mark (registered in the U. S. Patent Office) identifying the zinc alloys developed by The New Jersey Zinc Company and used in the die casting industry.

This zinc alloy die cast spark plug shield has walls which are only .015" to .020" thick.



For additional data on die casting design ask us—or your die casting source—for a copy of the booklet "Designing For Die Casting."

Send for your copy



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Industrial Paint Producer Opens New Laboratory

Research center in full operation at Arco Co., maker of automotive and household equipment finishes

ARCO CO., Cleveland, producer of paint, lacquer, enamel and varnish products primarily for the automotive and household equipment industries, has completed a new laboratory building to house the major portion of its expanded research division which is now in full-scale operation.

The two-story facility has three main laboratories besides special equipment rooms, offices and a reference library. Research activities of the company have been organized into a products development laboratory, a resin research section, an evaluation department, which all are located in the new building, and a customer service laboratory situated in an older part of the plant where formerly all research projects of the 66-year-old Arco Co. were housed.

The products development department performs exploration and development work on protective coatings of all types, and in addition revises formulae resulting from introduction of new raw materials or creation of substitute ingredients. Some of its equipment includes mills for experimental batches, gas-fired, electric-heated and infra-red baking ovens and spray booth and dip-tank installations.

Research on resin-based protective coatings and production control of Arco-originated synthetic resins are centered in the resin research laboratory. Its noteworthy equipment includes a two-roll rubber compounding mill and three pilot-plant units.

The evaluation laboratory tests materials, establishes standards and sets up qualitative controls governing paint and lacquer output. Original apparatus designed to accomplish these ends has been developed by Arco technicians.

The customer service section, which has been expanded, is organized to deal largely with short-range problems.

The expanded research and development program being conducted by Arco Co. in its recently completed laboratory is directed by Dr. Eugene W. Kanning, second from left, director of research; Dr. Edward G. Bobalek, left, manager of the resin research department; J. J. McCormick, seated at right, manager of the products development laboratory; and David M. Williams, standing, manager of the products evaluation department

RB & W Begins 5-Year Plan Of Expansion, Modernizing

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has begun a substantial 5-year expansion program whereby its present annual steel consumption of 120,000 tons can be increased 20 per cent.

This was recently disclosed by Evans Ward, president, along with the fact the company has already ordered more than $2,000,000 of new machinery for the program.

Details of the 5-year expansion include the following breakdowns of expense: (1) A total of more than $3,000,000 in plant equipment necessary to modernize and expand present manufacturing equipment; (2) an increase of inventories of about $2,300,000, including an expansion of inventories in finished goods at the company's four plants, amounting to more than $1,500,000, coupled with increased stocks of raw steel of more than $850,000; and (3) construction of additional factory buildings costing about $325,000.

At Port Chester about $882,000 will be spent for nut and bolt making machines, secondary operations and some new machine tools; at Coraopolis, Pa., $733,000 for new buildings and machinery; Rock Falls, Ill., $721,000 for new buildings to cost $110,000 and machine tools, heat treating equipment, headers and secondary equipment; and at Los Angeles $605,000, including $120,000 for new buildings and the balance for machine tools, headers and other equipment.

Not included in the above tabulation is a recent addition at Port Chester and installation of a new machine screw department.

The 5-year program was actually started early this year, but announcement of the plan was delayed, Mr. Ward explained, until some of the major orders had been placed. Mr. Ward pointed out that metal product manufacturers face a serious problem in modernizing and improving their plants because of sharp increases in costs over recent years. Many manufacturers are finding it necessary to pay more than double the prices for machinery bought ten years ago. For example, he said, headers which formerly cost from $6000 to $7000 now run from $16,000 to $18,000.

Group of Ohio Business Men Purchase Wel-Met Co.

Wel-Met Co., Kent, O., manufacturer of powdered self-lubricating metal bearings and parts, has been sold to a group of Ohio business men. The firm was formerly a subsidiary of S. K. Wellman Co., Cleveland.

Heading the group of purchasers are T. L. Robinson, president; H. Leslie Kinney, executive vice president in charge of sales; and Leo R. Kuntz, secretary and treasurer. Mr. Robinson, head of the Kent firm since its inception as a subsidiary of Wellman, was formerly associated with Amplex Division of Chrysler Corp.

First step in a proposed expansion of the company's sales coverage has been the establishment of sales headquarters in Cleveland at 5715 Walworth Ave.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Bell & Howell Co., Chicago, manufacturer of movie projectors and other motion picture equipment, has purchased Microfilm Recording Co., Chicago. Bell & Howell's sales, service and repair departments and processing laboratories have been moved to the LaSalle-Wacker Bldg. quarters occupied by Microfilm Recording Co.

—o—

Muir Machine Tools Ltd., Manchester, England, has changed its name to David Brown Machine Tools Ltd.

—o—

Kaiser-Frazer Corp., Willow Run, Mich., reports that daily shipments of its cars are approximating $1,500,000 in value, and that the Willow Run factory now employs more than 12,000 persons.

—o—

American Washer & Ironer Manufacturers' Association, Chicago, reports that sales of household laundering appliances totaled 1,754,639 in the first half of 1947, compared to 2,023,981 in all 1946 and 1,959,887 in all 1941, the greatest prewar year.

—o—

Standard Steel Spring Co., Coraopolis, Pa., manufacturer of springs, bumpers and other products, announces that its plant in Newton Falls, O., has begun operation at 20 per cent of capacity. The facility was purchased from the government for $638,000 last year.

—o—

American Bantam Car Co., Butler, Pa., has appointed Supercargo Trailers Inc., Cleveland, as distributor for the firm's line of truck trailers.

—o—

Porcelain Enamel Institute, Washington, reports that $7,600,000 worth of porcelain enameled products were shipped last May, only six per cent short of the record total of $8,100,000 set in April. The institute also reveals that $26,900,000 worth of porcelain enameled plumbing fixtures were shipped during the first quarter of 1947, a 161 per cent increase over shipments for the similar period in 1946.

—o—

Fram Corp., East Providence, R. I., manufacturer of oil filters, has purchased from WAA for $116.118 a welding rod plant at Pittsburg, Calif. Some machinery and equipment in the plant which was not included in the sale will be removed for disposition by WAA.

—o—

War Assets Administration is offering for sale or lease 13 complete industrial areas in Houston, Tex., constituting the industrial plant formerly operated by Hughes Tool Co. Bids are invited for all 13 areas or for any single area as a unit.

—o—

Grede Foundries Inc., Waukesha, Wis., recently celebrated its twentieth anniversary.

—o—

American Rolling Mill Co., Middletown, O., has purchased for $125,000 from WAA foundry facilities built by the government as an extension to Armco's plant.

—o—

Tinnerman Products Inc., Cleveland, manufacturer of speed nuts, clips and fasteners, is sponsoring a $5500 Tinnerman Trophy Race at the National Air Races in Cleveland Sept. 1. The race, on a 15-mile pylon course, is for Bell P-63 fighter type planes.

—o—

Harry W. Smith Inc., 480 Lexington Ave., New York, has been formed as a publicity firm specializing in feature engineering material. Harry W. Smith Jr., principal in the company, has been vice president and director of technical news for John Mather Lupton, manager of technical information for Selas Corp. of America and director of industrial and commercial publicity for the American Gas Association.

—o—

McClure & Wilder Co., Warren, O., has moved from the Mahoning Bldg. to its own building at 522 N. Park Ave., Warren.

—o—

Baker-Raulang Co., Cleveland, manufacturer of power industrial trucks, tractors and cranes, is increasing its capacity 50 per cent by an addition now being constructed at its Cleveland plant and by still another addition shortly to be started.

—o—

Coleman Co. Inc., Wichita, Kans., manufacturer of home heating equipment, recently began production of oil-burning floor furnaces at its new plant in Wichita.

—o—

U. S. Machine Corp., Lebanon, Ind., has augmented its line of Winkler heating equipment with high and low pressure conversion oil burners and an oil-burning space heater.

—o—

National Bureau of Standards, Washington, has consolidated two divisions—Commercial Standards and Simplified Practice—into a single section called Commodity Standards. The new division will continue the bureau's co-ordinating role in the development of voluntary simplified practice recommendation and commercial standards.

—o—

Progressive Welder Co., Detroit, manufacturer of resistance welding equipment, has acquired Warren Alloy & Machine Co. which operates a nonferrous foundry in Warren, O., and a jig, fixture, die, gage and punching unit plant in Detroit. Warren will be operated as a division of Progressive.

—o—

Condenser Service & Engineering Co. Inc., Hoboken, N. J., engaged in metal spray work, has opened a new plant at 601 Newark St., Hoboken.

—o—

Enterprise Engine & Foundry Co., San Francisco, has acquired and will manufacture the entire line of Hendy marine and stationary diesel engines formerly made by Joshua Hendy Iron Works, Sunnyvale, Calif.

—o—

B. C. Ames Co., Waltham, Mass., manufacturer of micrometer dial gages and indicators, has appointed Marshall Supply & Equipment Co., Tulsa, Okla., as sales representative for Oklahoma.

—o—

Industrial Furnace Manufacturers Association Inc., New York, has announced a prize contest to promote publication of articles in the trade press describing industrial furnaces, kilns and ovens. Papers published between Oct. 1, 1947, and Sept. 1, 1948, will be eligible for the $1000 first prize, $300 second prize or $200 third award.

—o—

War Assets Administration is offering for sale or lease an aluminum reduction plant at Burlington, N. J., which Aluminum Co. of America operated during the war. The facility has a floor area of 700,000 sq ft, and the land site totals about 70 acres. The WAA Philadelphia office will receive bids until Aug. 27.

—o—

Cutler-Hammer Inc., Milwaukee, manufacturer of electrical equipment, announces that its Cleveland sales office has been moved to 2010 E. 46th St. The company has also opened a new sales office at 107 N. Franklin St., Saginaw, Mich.

—o—

War Assets Administration has offered for sale or lease the Kenmore, N. Y., aircraft assembly plant, operated during the war by Curtiss-Wright Corp. On a land site of 23 acres are six buildings with a total floor area of 340,000 sq ft. Bids to buy or lease will be received by the New York WAA office until Aug. 22.

The Business Trend

Industrial Activity Exhibits Stronger Tone

CONTINUED strong operations in most industrial fields and improvement in automobile output pushed STEEL's industrial production index in the week ended Aug. 2 up to 161 per cent of the 1936-1939 average, four points above the preceding week. This placed the current index within three points of the postwar high of 164.

In making some recovery, automobile production in the week ended Aug. 2 rose to an estimated 94,408 passenger cars, trucks and busses, compared with 83,867 in the preceding week. The current rate is considerably below the postwar high of 108,472 units, chiefly because of insufficient and unbalanced supplies of steel and a strike in an auto body producer's plants.

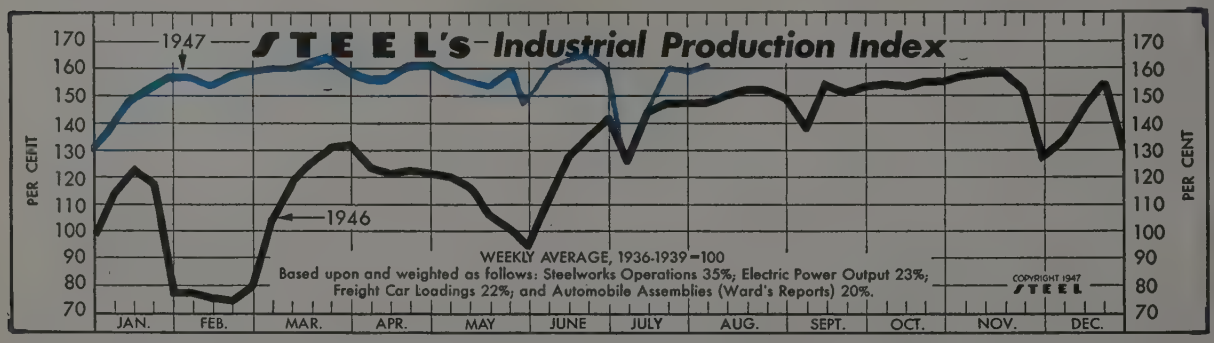
STEEL—The auto industry's huge requirements, coupled with strong pressure from other consuming groups, is maintaining the heavy demand for steel, despite recent increases in steel prices. Reflecting the volume of demand, steel ingot production is currently around 95 per cent of capacity. Of the first 32 weeks this year the rate in 16 has been at or above 95.

COAL—A drop in bituminous coal output marked the first full week of mine operations under the new mine contract. Estimated production in that period, week ended July 26, was 11,800,000 net tons, about a million tons below normal. The National Coal Association reported surveys indicate very few operations are producing tonnage comparable with normal periods under the old contract. A general survey, the association said, would indicate perhaps an average loss of from 8 to 10 per cent, despite the fact some captive mines are operating on a 24-hour basis because of the dire need for coal and the fact that generally the mines are operating on a 6-day basis.

PRICES—Higher bituminous coal prices growing out of the new mine contract and increases in pig iron prices were chiefly responsible for an average rise of 0.2 per cent in the U. S. Bureau of Labor Statistics wholesale price index in the week ended July 26. Agricultural prices declined slightly. The rise placed the index at 150.6 per cent of the 1926 average, a new postwar peak.

PRODUCTION—Marking the third consecutive month of decline, the June industrial production index of the Federal Reserve Board receded to 183 per cent of the 1935-1939 average. This was a two-point decline from May and a seven-point drop from the postwar high of 190 in March. The board indicated a further reduction would be reported for July.

CONSTRUCTION—New construction in July showed a gain, the U. S. Commerce Department reported. Total was $1,139,000,000, up 8 per cent over June and 16 per cent over July, 1946. Total value of new construction in the first seven months of 1947 is estimated at $6,487,000,000, compared with $4,806,000,000 in the corresponding period of last year.



The Index (see chart above): Latest Week (preliminary) 161 Previous Week 157 Month Ago 124 Year Ago 148

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	95.0	95.0	73.0	88.5
Electric Power Distributed (million kilowatt hours)	4,806	4,730	4,190	4,351
Bituminous Coal Production (daily av.—1000 tons)	1,967	2,000	1,333	2,100
Petroleum Production (daily av.—1000 bbl.)	5,088	5,084	5,065	4,881
Construction Volume (ENR—Unit $1,000,000)	$100.8	$134.8	$105.6	$115.7
Automobile and Truck Output (Ward's—number units)	94,408	83,867	63,460	79,385

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

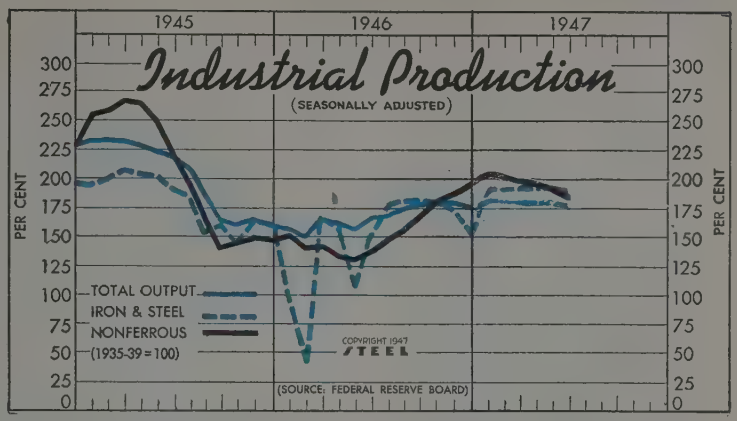
TRADE				
Freight Carloadings (unit—1000 cars)	919†	920	629	898
Business Failures (Dun & Bradstreet, number)	69	76	82	14
Money in Circulation (in millions of dollars)‡	$28,129	$28,145	$28,409	$28,245
Department Store Sales (change from like wk. a yr. ago)‡	+4%	+8%	+3%	+33%

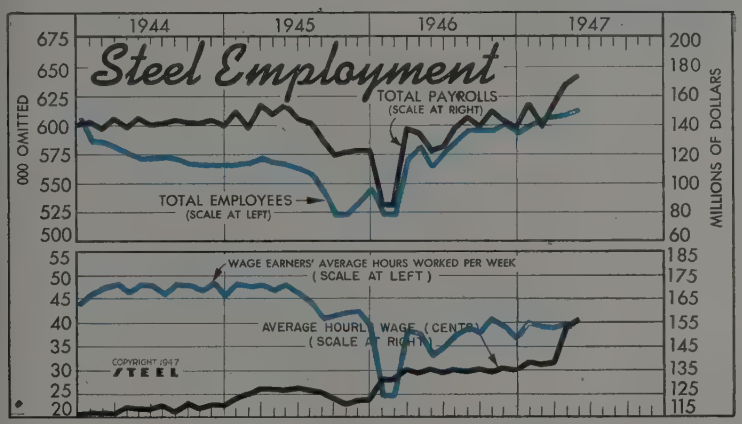
† Preliminary. ‡ Federal Reserve Board.

Federal Reserve Board's Production Indexes

(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1947	1946	1947	1946	1947	1946
Jan.	189	160	192	102	204	150
Feb.	189	152	191	43	205	141
Mar.	190	168	196	169	199	139
Apr.	186	165	195	159	197	132
May	185	159	197	109	187	128
June	183	170	193	154	183	137
July	...	172	...	180	...	151
Aug.	...	178	...	184	...	159
Sept.	...	180	...	185	...	172
Oct.	...	182	...	184	...	184
Nov.	...	183	...	178	...	192
Dec.	...	182	...	159	...	197
Ave.	...	171	...	150	...	157





Steel Employment

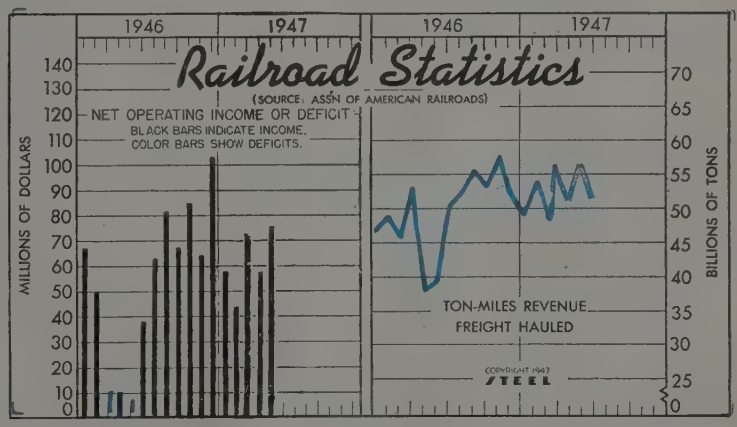
	Employees† (000)		Total Payrolls (millions)		Hourly Wage† (cents)	
	1947	1946	1947	1946	1947	1946
Jan.*	601	522	$155.8	$84.9	138.1	131.4
Feb.*	607	522	139.5	84.9	137.0	131.4
Mar.	609	570	150.6	138.8	137.9	135.1
April	611	582	168.3	134.3	153.3	134.1
May	615	563	175.8	121.4	155.6	135.8
June	...	578	....	125.6	....	134.4
July	...	585	....	138.0	....	135.1
Aug.	...	596	....	145.2	....	134.6
Sept.	...	596	....	139.6	....	136.2
Oct.	...	596	....	150.6	....	134.1
Nov.	...	600	....	143.4	....	136.7
Dec.	...	594	....	137.2	....	135.2

† Monthly average. * Figures for January and February, 1946, are merely averages derived from a report that combined those two strike-affected months.

Statistics of Class I Railroads

	Net Operating Income —millions—			Ton-Miles Revenue Freight —billions—		
	1947	1946	1945	1947	1946	1945
Jan.	$57.7	$66.7	$76.0	53.3	48.2	56.8
Feb.	43.1	50.5	74.7	48.5	45.1	55.4
Mar.	72.8	*5.7	102.0	56.1	52.4	64.4
Apr.	58.4	10.1	95.1	50.7	37.0	61.4
May	75.7	*4.8	103.6	56.0	39.0	64.2
June	...	38.1	99.9	51.5	50.0	62.6
July	...	62.8	98.8	...	51.5	60.7
Aug.	...	81.7	87.5	...	55.0	56.8
Sept.	...	67.4	43.1	...	52.7	52.6
Oct.	...	85.1	52.4	...	57.0	49.8
Nov.	...	64.1	60.7	...	51.5	49.8
Dec.	...	103.0	42.0	...	49.6	46.3
Ave.	...	$51.6	$78.0	...	49.0	56.7

* Deficit.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,943	$12,536	$13,872	$11,730
Federal Gross Debt (billions)	$259.3	$258.8	$258.4	$268.6
Bond Volume, NYSE (millions)	$18.5	$22.2	$17.2	$18.4
Stocks Sales, NYSE (thousands)	5,256	5,423	4,191	4,127
Loans and Investments (billions)†	$63.5	$63.4	$55.0	$60.5
United States Gov't. Obligations Held (millions)†	$39,154	$39,145	$34,312	$42,266

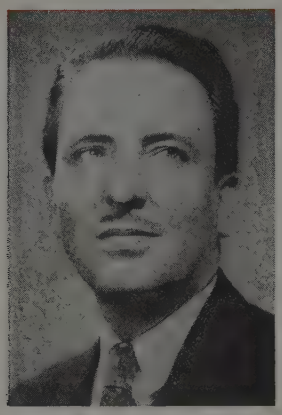
† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$74.77	$69.14	$69.82	$64.45
All Commodities†	150.6	150.3	147.6	124.1
Industrial Raw Materials†	166.0	165.2	161.6	140.2
Manufactured Products†	145.0	145.1	142.7	119.3

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry



RAYMOND V. PFAUTSCH

EARL A. CHANNER

Raymond V. Pfautsch has been named chief engineer of Ilg Electric Ventilating Co., Chicago. He succeeds **A. G. Sutcliffe,** who has retired after 37 years' service with the company, acting as chief engineer for the past 20 years. Mr. Pfautsch became associated with Ilg in 1929 and was named assistant chief engineer in 1940.

—o—

Randolph W. Hyde has been elected treasurer of Carnegie-Illinois Steel Corp., Pittsburgh, succeeding **Leon F. Payne,** deceased. Starting work with the U. S. Steel Corp. subsidiary in 1922, he has held various executive positions.

—o—

Arthur B. Austin has been named assistant manager, Chicago branch office, by the Explosives Department, Hercules Powder Co., Wilmington, Del. Mr. Austin joined Hercules in 1933 and for the past 14 years has been a sales and technical service representative in the department's offices in Hazleton, Pa., Joplin, Mo., and Wilmington.

—o—

Appointment of **Henry E. Kerley** as assistant chief engineer in charge of the Pittsburgh engineering department has been announced by McNally Pittsburg Mfg. Corp., Pittsburg, Kans. He joined the company in 1934, serving successively as apprentice draftsman, design engineer and section chief. In the latter capacity he was transferred to the Pennsylvania office, where he has been since 1945.

—o—

Bailey Meter Co., Cleveland, has assigned **J. H. Wilson** to the Cincinnati branch office and **R. W. May** to the New York office, following their completion of company's cadet engineering course.

—o—

Robert D. Stuart has been named sales promotion manager of General Products Division, United States Rubber Co., New York. He has been with the company since January, acting as assistant to the advertising director.

—o—

Earl A. Channer, former Chicago district head and New York branch manager for H. M. Harper Co., Chicago, has been appointed manager of the Harper company's new Cleveland factory branch office at 17600 Detroit Ave. Mr. Channer joined the Harper organization in 1939, left the company in 1942 to see service with the Army Air Forces, and rejoined the firm in 1945.

—o—

Harold D. Ferguson has been appointed director of Latin American sales for Kaiser-Frazer Export Corp., Willow Run, Mich. A veteran export executive, Mr. Ferguson had served first with White Motor Co., Cleveland, from 1928 to 1935, acting as district manager on South America's west coast, with headquarters in Santiago, Chile, later representing Chrysler Export Corp. in the Caribbean Division from 1935 to 1942, and during the war was with the Office of Strategic Services with headquarters in Spain.

—o—

James G. Coakley has been named sales manager of Washington Forge Inc., Englishtown, N. J. He had been with Associated Merchandising Corp.

—o—

Kenneth W. Sickinger has been placed in charge of advertising for the Radio Division, Stewart-Warner Corp., Chicago. He formerly had been a department manager with Oakes & Co., Chicago, and prior to that had been assistant general sales and advertising manager, Belmont Radio Corp., Chicago.

—o—

Hydro-Line Mfg. Co., Rockford, Ill., has appointed the following exclusive sales representatives in their respective territories: **Harry B. Ribbel,** Arlington, Mass.; **John S. Diefenbach,** Ansonia, Conn.; and **R. E. Hayden,** Minneapolis.

—o—

F. P. Zimmerli, chief engineer, Barnes-Gibson-Raymond Division, Associated Spring Corp., Detroit, has been named by the American Society for Metals, Cleveland, to receive that organization's highest honor, the Albert Sauveur Award. Presentation will be made in Chicago Oct. 23 at the annual banquet of ASM. Mr. Zimmerli was selected for his basic research in the field of shot peening.

—o—

E. B. Brant has been appointed district sales manager, Pittsburgh, Page Steel & Wire Division, American Chain & Cable Co. Inc., Monessen, Pa., succeeding **Fred H. Jones,** retired. Mr. Brant has been with the division in its Detroit office.

—o—

Richard E. Dougherty, vice president, New York Central Railroad, and former director and vice president of the American Society of Civil Engineers, New York, has been nominated as the 1948 president of the society, to be elected late this fall.

—o—

Wade A. Eskridge has been appointed assistant district manager in the midcontinent territory of Twin Disc Clutch Co., Racine, Wis., to take charge of operations in the Tulsa, Okla., office. **H. A. Davis,** manager of the territory, has changed his headquarters fom Tulsa to Dallas, Tex.

—o—

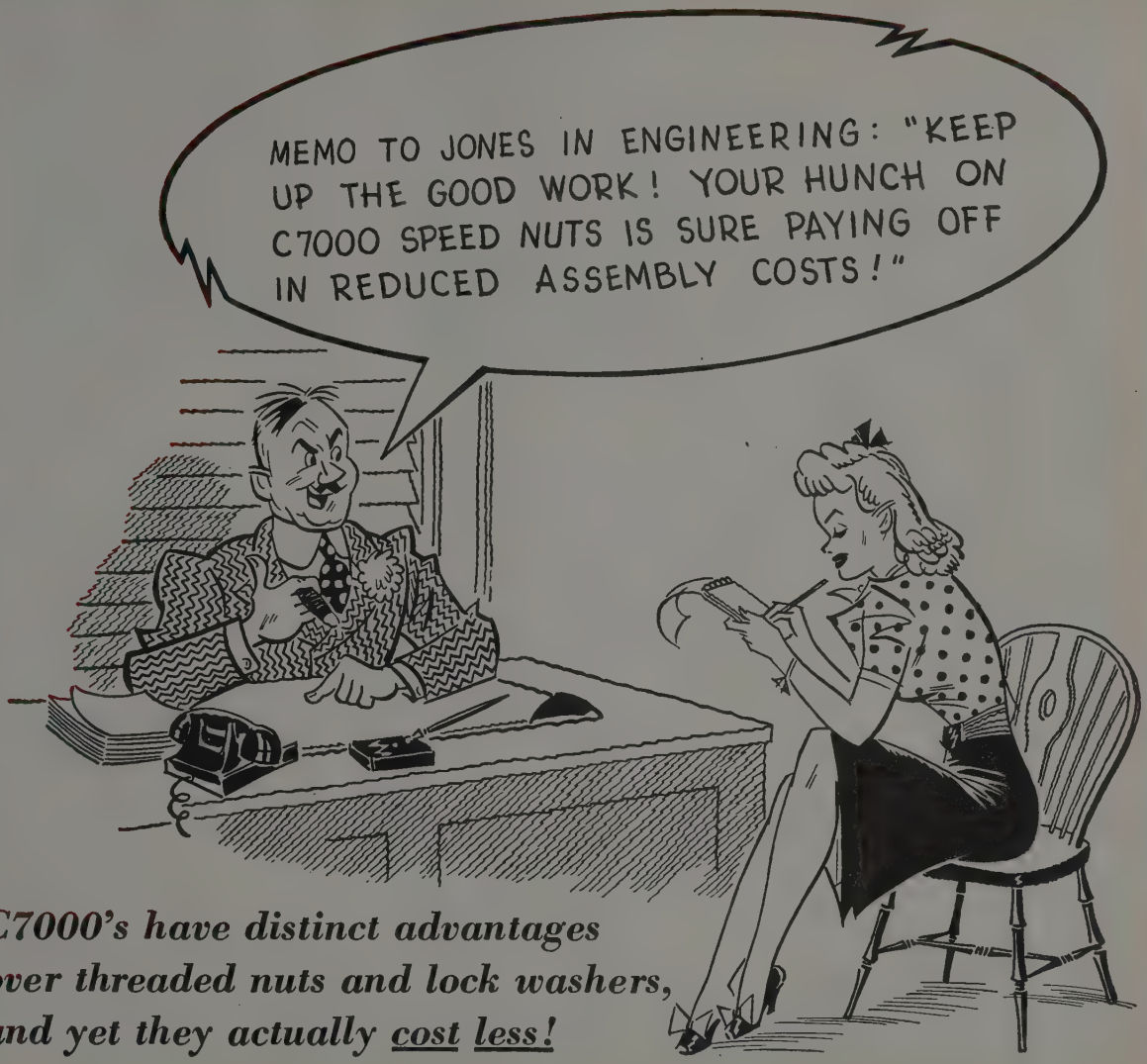
Robert A. Gillies has been appointed vice president, Steel Co. of Canada, Montreal, Canada. He will be in charge of all manufacturing and will have headquarters in Hamilton, Ont. Coming to the company in 1928 from the Illinois Steel Co., S. Chicago, Ill., he was successively superintendent of blast furnaces, assistant works manager and works manager of the Hamilton Works.

—o—

Dr. John N. Mrgudich has been appointed research director of the electrical divisions of Winchester Repeating Arms Co. and Bond Electric Corp., divisions of Olin Industries Inc., E. Alton, Ill. He had previously been director of research and associate chief engineer, Burgess Battery Co., Freeport, Ill., and during the war was chief of the Photograph Branch, Army Signal Corp.

—o—

R. L. Puette has been elected vice president in charge of production, Clark Controller Co., Cleveland. Beginning


MEMO TO JONES IN ENGINEERING: "KEEP UP THE GOOD WORK! YOUR HUNCH ON C7000 SPEED NUTS IS SURE PAYING OFF IN REDUCED ASSEMBLY COSTS!"

C7000's have distinct advantages over threaded nuts and lock washers, and yet they actually cost less!

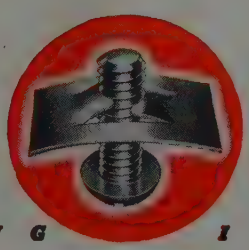
Get hep! Every threaded nut and lock washer on your product is a potential cost-saving spot. The new C7000 SPEED NUTS double for washer and nut, are applied faster and prevent vibration loosening. Write today for the free sample box of ten popular sizes and find out for yourself why more and more manufacturers go modern by changing over to SPEED NUT brand fasteners. Get that letter off today.

Samples
OF THE NEW
C7000 SERIES FLAT TYPE
Speed Nuts
FASTEST THING IN FASTENINGS
Cost less than Threaded Nuts Plus Lock Washers
TINNERMAN PRODUCTS, INC.
2039 FULTON ROAD • CLEVELAND 13, OHIO

TINNERMAN PRODUCTS, INC.
2039 FULTON ROAD, CLEVELAND 13, OHIO

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London
In France: Aerocessoires Simmonds, S. A., Paris
In Australia: Aerocessories, Pty. Ltd., Melbourne

Speed MORE THAN 3000



Nuts* PATENTED SHAPES AND SIZES

*Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS

work with the company in 1930, Mr. Puette has served as manager of the application engineering department, assistant sales manager, sales manager and works manager.

—o—

D. A. Griffith has been named assistant to **J. W. McMullen,** general manager, Pittsburgh Works, Allis-Chalmers Mfg. Co., Milwaukee. Mr. Griffith has been associated with the company in the transformer section of the Pittsburgh plant since 1927. Prior to that date he was with the Bureau of Mines, Department of the Interior.

—o—

J. Paul Ahlbrandt has been appointed to the newly created post of director of manufacturing, Hamilton Mfg. Co., Two Rivers, Wis. He had been associated with Bendix Home Appliances Inc., South Bend, Ind., as assistant to the vice president, manufacturing.

—o—

Wells N. Thompson, vice president, H. K. Ferguson Co., Cleveland, has been appointed project director in charge of constructing and equipping the atomic pile at Brookshaven National Laboratory. A member of the Ferguson organization for more than 25 years, he has been in charge of the firm's Eastern District and and also headed its Export Division.

—o—

M. P. Cortilet, formerly assistant manager of sales, Central Division, American Can Co., New York, has been appointed manager of sales of the division, succeeding **H. A. Pinney,** who has been made assistant to the vice president.

—o—

Herbert J. Noble, vice president and treasurer, Taylor Instrument Cos., Rochester, N. Y., has been elected executive vice president and assistant general manager of the organization.

—o—

Transfer of **T. J. O'Neil,** Ford Motor Co. sales district manager at Indianapolis, to managership of the Memphis, Tenn., district has been announced. In his new post he will succeed **H. Y. Ingram,** who has resigned to become a partner in a Ford dealership at Greensboro, N.C.

—o—

C. W. Harrold, chief engineer, Harris Division, Harris-Seybold Co., Cleveland, since 1919, has been named vice president in charge of engineering and development. In his new position he will co-ordinate all engineering, product development and technical research activities.

—o—

Boyd V. Giesey, for the past two years in charge of the Flash Welder Division, Progressive Welder Co., Detroit, has been named to head all sales of the company's resistance welding equipment in the Michigan territory north of Detroit. Assisting him will be **Robert O. Wight,** formerly welding applications engineer. New offices will be opened by Mr. Giesey at 320 S. Larch St., Lansing, Mich.

DONALD V. STEGER

JOHN H. ELLIOTT

—o—

Donald V. Steger, former director of industrial relations, John B. Stetson Co., Philadelphia, recently was elected executive secretary of the Western Society of Engineers, Chicago. He succeeds **Leigh S. Keith,** who has been secretary of the society since 1935.

—o—

American Car & Foundry Co., New York, has appointed **Lloyd H. Mulbarger** as sales engineer in its New York sales office. He had been chief draftsman, Advisory Mechanical Committee, Chesapeake & Ohio, Erie, Nickel Plate, and Pere Marquette railroads.

—o—

J. R. B. Freeman, formerly refinery sales representative, Bethlehem Supply Co. of California, San Francisco, has been named district manager of the San Francisco area, a newly created position. **R. B. Trimble** will take over Mr. Freeman's work in Los Angeles, and **R. A. Casson,** in addition to his pumping units sales work, will take over Mr. Trimble's sales of sucker rods and wire rope.

—o—

J. J. Reagan has been appointed manager of sales, Pittburgh district sales office, American Steel & Wire Co., succeeding **Frank J. Marmion,** deceased. **S. M. Parks** succeeds Mr. Reagan as assistant manager of sales in the Pittsburgh office of the U. S. Steel Corp. subsidiary.

—o—

Federal Products Corp., Providence, R. I., has announced the following changes in office personnel and addresses of branch offices: **Ralph H. Chapman,** formerly in the Detroit office, has been put in charge of the Los Angeles office, now located at Room 214, 1489 W. Washington Blvd.; **Kenneth A. Heinold,** formerly manager of the Los Angeles office, is now manager of the Rochester, N. Y., office at Room 814, Genessee Valley Trust Bldg.; and **Jack Kelsey,** formerly manager of the Rochester office, is now manager of the Cleveland office at 713 Hanna Bldg. Annex.

—o—

John H. Elliott has been appointed general superintendent, Irvin Works, Carnegie-Illinois Steel Corp., Pittsburgh, to succeed **Laurence S. Dahl,** who has been appointed general superintendent, Youngstown District, of the United States Steel Corp. subsidiary. Mr. Elliott began work with U. S. Steel in 1919 in the engineering department of the American Sheet & Tin Plate Co. In 1926 he was transferred to the Shenango Works where in 1937 he became assistant superintendent. Later that year he was transferred to the Irvin Works as superintendent of the Tin Finishing Division; in 1939 he was made assistant to the general superintendent, and in 1940 became assistant general superintendent, the post which he held until his present appointment. Mr. Dahl will succeed **A. C. Cummins,** deceased, as superintendent at Youngstown. First employed by U. S. Steel in 1924 at the Gary Works, he became the Irvin Works first assistant general superintendent in 1937 and was appointed general superintendent of the works in 1940. **Arno L. Billeter** has been appointed assistant general superintendent of the Irvin Works, having been promoted from superintendent of the Vandergrift plant of the works. **Albert J. Berdis** will succeed him in the latter position.

—o—

Jones & Laughlin Steel Corp., Pittsburgh, has announced the following appointments: **H. D. Stark,** formerly general superintendent of the Pittsburgh Works, as assistant general manager of manufacturing operations of the company; **A. T. Lawson,** formerly chief industrial engineer of the corporation, as general superintendent of the Pittsburgh

NOTHING SUCCEEDS LIKE SUCCESS

300-ton 2-point
Eccentric Gear
Gap Frame Press

Warco PRESSES

WARREN CITY MANUFACTURING COMPA

487 Griswold Street, Warren, Ohio

A subsidiary of The Federal Machine and Welder Company

Offices in Principal Cities

200-Ton OBI Press | Horn Press | Single Crank Gap Press | Double Crank Gap Press | Single Crank Straight Side Press | Double Crank Straight Side Press | Two Point Eccentric Gear Press | Hydraulic Press | Press Brak

Works; and **W. L. Witney**, formerly assistant chief industrial engineer, as chief industrial engineer.

—o—

A. L. Sonnhalter, for 15 years vice president in charge of the Pittsburgh Crucible Division, Midland, Pa., Crucible Steel Co. of America, New York, has resigned because of ill health. He will continue as a director of the company and will serve as advisor to the management. He has been elected president of Midland Water Co., a Crucible subsidiary.

—o—

Robert J. Bowman, president, Chesapeake & Ohio Railway, Cleveland, has been appointed a member of the executive council of the Federation for Railway Progress, Cleveland, to represent railroad members. **Robert M. Drysdale Jr.** has been appointed treasurer of the federation to succeed **J. J. Anzalone**, resigned. Mr. Drysdale until June, 1947, when he joined FRP, was assistant to the vice president in charge of traffic, Grace Line Inc.

—o—

George H. Hulse has been named vice president and secretary of the recently organized Precision Drawn Steel Co., Camden, N. J. He had formerly been assistant general purchasing agent, Philco Corp., Philadelphia, with which he had been associated for 18 years.

—o—

Joseph A. Bogan has been appointed business assistant on the staff of Bituminous Coal Research Inc., Pittsburgh, a position recently created by the group's executive committee. He came to the research agency from Carnegie-Illinois Steel Corp.'s Irvin Works and had served in the Washington office of the Federal Bureau of Investigation. At BCR he will handle contractual, patent and similar transactions for the group and its allied industries and laboratories.

—o—

Expansion of sales representation has been made by American Nickeloid Co., Peru, Ill., with the establishment of a New England sales office at Beverly, Mass. **J. F. Schoellhorn**, formerly of the company's Chicago office and prior to that of the main office, will be in charge. Three other sales representatives have also been named by the company. **Norman D. Standal** has joined the Seattle office, and **William Watts** and **John Richards** have joined the Chattanooga, Tenn., staff.

—o—

George Pickering has been appointed works manager, L. C. Smith Gun Co. Inc., Fulton, N. Y., subsidiary of Marlin Firearms Co.

—o—

L. W. Whitton and **L. W. Coffin** have been elected vice presidents of Otis Elevator Co., New York. Mr. Whitton has been manager of operations and Mr. Coffin, general service manager. Both will continue in these duties.

—o—

Clyde Dickey, general director of sales, Federal Telephone & Radio Corp., Clifton, N. J., has been elected to the executive committee of the Transmitter Division, Radio Manufacturers Association, Washington.

—o—

A. K. Lowe, formerly sales engineer for Timken Roller Bearing Co., Canton, O., has been named purchasing agent, Young Iron Works, Seattle, to succeed **William R. Lindersmith.**

—o—

Hugo A. Leander, formerly vice president, general manager and a director of W. L. Maxson Corp., New York, has been elected president of the engineering firm to succeed **W. L. Maxson**, deceased. **William L. Maxson Jr., William E. Hocker, W. Herbert Beal** and **Harold Kondolf** have been elected new directors.

—o—

Zenith Radio Corp., Chicago, has announced the following appointments: **Orrin E. Wolf** as vice president in charge of the hearing aid division; **J. E. Anderson** as vice president in charge of purchasing; and **Willy Dumke** as vice president in charge of production of speakers, transformers and hearing aids.

—o—

Larry H. Coffin, formerly plant manager of tire, textile and mechanical goods operations in Sao Paulo, Brazil, for Goodyear Tire & Rubber Co., Akron, has returned to Akron to act as assistant to **George K. Hinshaw**, vice president and production manager for Goodyear's foreign operations. **Marvin A. Ryan**, who has been in charge of the Cuba plant, succeeds Mr. Coffin as Sao Paulo plant manager. Three other Goodyear men who hold foreign posts are in the United States on home leaves. They are: **M. S. Meyer**, managing director, operations in India; **W. J. Condon**, plant manager, Sydney, Australia; and **Readon West**, production superintendent, tires, Goodyear-Argentina factory. **Robert R. Boyle** has been named division superintendent, Goodyear tire plant at Buitenzorg, Java. He joined the company in 1933, during the war was associated with Goodyear Aircraft Corp. and in 1945 returned to Goodyear Tire.

—o—

George H. Harris has been appointed manager of the new Milwaukee office of Union Chain & Mfg. Co., Sandusky, O.

—o—

P. P. Echols has been named assistant to the Warren district manager, Republic Steel Corp., Cleveland, succeeding **M. D. Wald**, who has been transferred to Cleveland as assistant district manager. **H. J. Walker** has been named general superintendent of the Warren plant. Mr. Echols joined Republic at Warren as chief metallurgist, after being with Bethlehem Steel Co., Bethlehem, Pa., and Weirton Steel Co., Weirton, W. Va. Mr. Walker had been with Trumbull Steel Co., predecessor to Republic and in 1938 was made superintendent of open hearths.

—o—

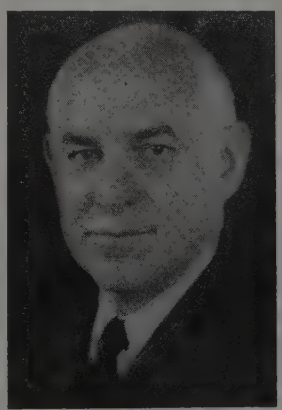
O. C. Burger has joined Gordon Lubricating Co., Pittsburgh, as lubricating engineer. He was formerly associated with Pure Oil Co., Chicago.

—o—

B. C. Gould has been elected executive vice president, Murray Corp. of America, Detroit. He was formerly vice president in charge of operations.

—o—

Herman G. Place has been elected president of General Precision Equip-

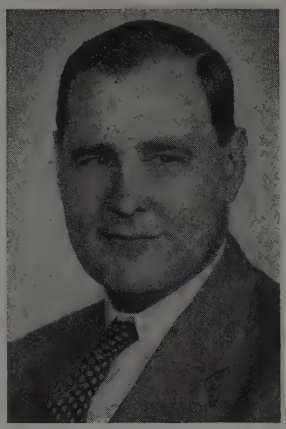


COL. FRANK H. HIGGINS

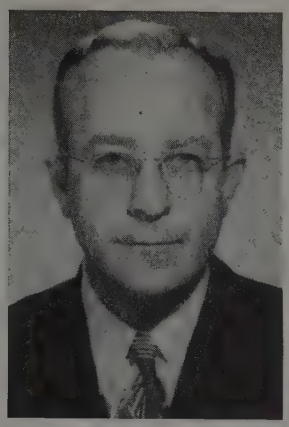
Elected vice president of Hupp Corp., Detroit, to head its local operations. Noted in STEEL, Aug. 4 issue, p. 86

FREDERICK J. RIKER

Has been named president of Livingstone Engineering Co., Boston. Noted in STEEL, Aug. 4 issue, p. 82



S. J. MORAN
Promoted to works manager, Union Steel Castings Division, Blaw-Knox Co., Pittsburgh. Noted in STEEL, Aug. 4 issue, p. 87



HOWARD H. LOVING
Appointed factory representative, Chicago district, for Adalet Mfg. Co., Cleveland. Noted in STEEL, Aug. 4, issue, p. 87

GEORGE D. FRAUNFELDER
Appointed director of engineering and research, Easton Car & Construction Co., Easton, Pa. STEEL, Aug. 4 issue, p. 82

ment Corp., New York, succeeding **Earle G. Hines,** who was named chairman of the board. Mr. Place has been a director and member of the executive committee of the company since its organization in 1946.

—o—

Earl W. Mahaney, former metallurgist for Youngstown Sheet & Tube Co., Youngstown, has been appointed assistant general superintendent of the company's strip and tin plate division at Indiana Harbor, Ind. He has been with the company since 1936.

—o—

George Paul Burks, since 1942 assistant superintendent of blast furnaces, Gary Works, Gary, Ind., Carnegie-Illinois Steel Corp., has been appointed superintendent of the works' furnace division, succeeding **Walter Scott McNabb,** retired. Mr. Burks has been connected with the U. S. Steel subsidiary works for nearly 32 years.

OBITUARIES . . .

Crawford Neal Kirkpatrick, 57, chairman, Landis Machine Co. Inc., Waynesboro, Pa., died at his home July 28 after several months' illness. In addition to the executive capacities he had served at the Landis company, including sales manager, secretary, general manager, vice president and president, he had been a director of the National Machine Tool Builders' Association (1943-1946), treasurer of that organization (1944), a member of National Metal Trades Association, National Industrial Conference Board, Army Ordnance Association, and had served on committees of the War Production Board, National Association of Manufacturers and American Petroleum Institute.

—o—

T. Scott Clingan, 72, who retired last January as vice president in charge of steel plant operations for Bethlehem Pacific Coast Steel Corp., San Francisco, died of a heart attack July 28, while on a visit to Seattle.

—o—

John Edward Weit, 75, president, Atlas Bolt & Screw Co., Cleveland, died Aug. 1 at his home in Willoughby, O.

—o—

Walter Fugh, secretary-treasurer, Simonds Gear & Mfg. Co., Pittsburgh, died unexpectedly July 28. He had been associated with the Simonds company for approximately 50 years, and, as a member of the American Gear Manufacturers Association, had served for about eight years as a member of its auditing committee.

—o—

LeBaron Kinney, 71, former division superintendent, White Motor Co., Cleveland, died at his home in East Cleveland Aug. 2. Coming to Cleveland in 1923 after 13 years as division superintendent for Studebaker Corp., S. Bend, Ind., he held a similar position at White until his retirement in 1934.

—o—

W. D. Caton, 52, general sales manager and vice president, Standard Register Co., Dayton, O., died July 28 while on a visit in Alexandria, Va.

—o—

Henry D. W. Loeffler, owner, H. D. Loeffler Co., Newark, N. J., manufacturer of screw machine products, died July 30 in Montclair, N. J.

—o—

Howard Haven Beatty, executive assistant to the chief of the Aluminum Co. of America's fabricating division, New Kensington, Pa., died Aug. 4 after a brief illness. He had been associated with the company for 30 years.

—o—

Arthur S. Phelps Jr., 42, purchasing agent, L. A. Young Spring & Wire Corp., Chicago, died July 31 in Wheaton, Ill.

—o—

Harry A. Marvel, 82, retired president of Marvel Shipyards, Newburgh, N. Y., died at his home in Newburgh, Aug. 2. Previous to founding his own shipbuilding company after the first world war, he had been superintendent of the Newburgh Shipyards.

—o—

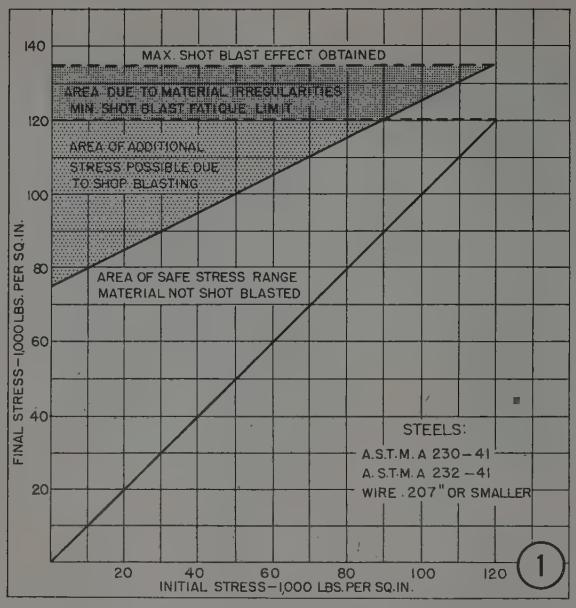
William Wailes Dashiell, 91, founder of New York Lubricating Oil Co., New York, died at his home in Stamford, Conn., Aug. 2. Besides founding the oil company, he organized Manhattan Rubber Co., now the Raybestos Co., Passaic, N. J., and at one time was general manager of Sloss Iron & Steel Co., Birmingham.

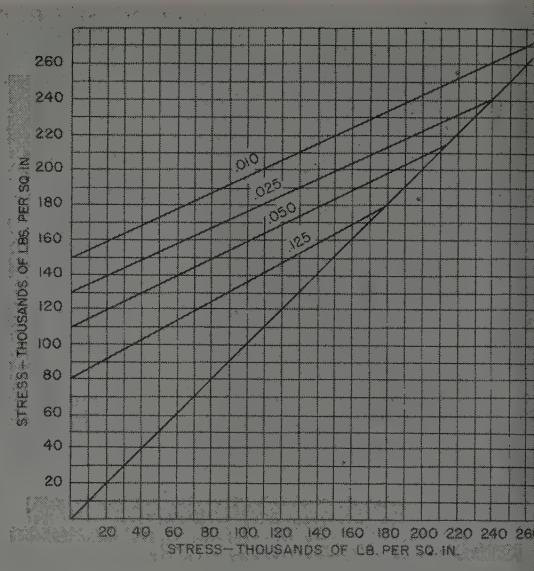
—o—

Frank H. Russell, 69, president of Manufacturers Aircraft Association Inc., New York, died Aug. 3 at his home near Newtown, Pa. He had been president of the association since 1917, although in 1931 he had retired from active participation in the aircraft industry following service as manager of Wright Co., Dayton, O., and Curtiss Engineering Co., Garden City, L. I., president of Burgess Aeroplane Co., Marblehead, Mass., and vice president of Curtiss Aeroplane & Motor Co., to join Edward G. Budd Mfg. Co. as vice president. He was with Budd until 1935.

—o—

Safford Kinkead Colby, 74, vice president in charge of research, sales promotion and advertising for Aluminum Co. of America, Pittsburgh, died Aug. 4 after a heart attack. He had been vice president since 1931.





SELECTING Springs

PRACTICALLY all mechanical assemblies depend upon springs for either their functioning or for their production. Despite their wide distribution, springs are in almost all instances so incorporated in the various mechanical units as to lose all identity of the source producing them. Because springs are a part of, but not often sold as a completed unit, large spring producing companies are actually unknown by the user of their product.

These conditions have resulted in a jobbing industry which for economic reasons is split into three major divisions. In the order of their demand for diversified materials, these are: 1. Mechanical, 2. heavy, or hot formed, 3. cushion, or upholstery.

Actually, the mechanical spring division is a cold forming industry. Springs are made of any material and any shape of material as flat, round, rectangular, etc., at room temperatures. After this forming they are given a suitable thermal treatment to resist the loads that they must withstand.

Heavy spring industry uses large sections of materials, and for this reason gives them the desired shape while they are hot enough to form easily. Temperature on ferrous materials is above the critical range. On nonferrous alloys temperature is sufficiently hot to form them, but not hot enough to cause excessive grain growth or other structural change. In some cases these types of springs are actually forged.

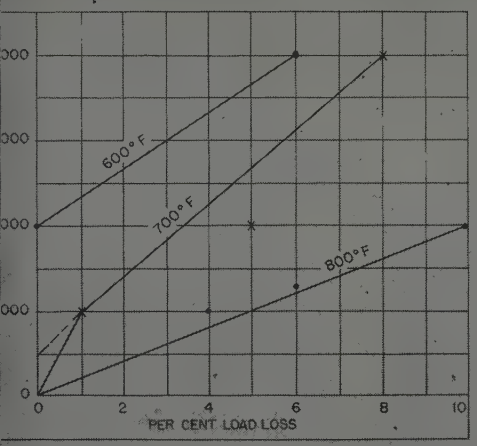
Cushion spring division forms most of the parts cold, but uses some forms of welding in making assemblies. Assemblies are also produced by very ingenious machinery with mechanical fastening. The material employed is not very large in cross section and is usually formed cold.

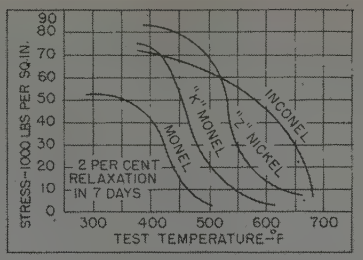
Flat Steel Springs: Materials available are in oil tempered steel, SAE 1095, 1074 and 1064. Of these, SAE 1095 should always be used pretempered while the other two can be obtained annealed. Use of oil tempered 1095, a poor hardening steel in heavy sections, is common in thin clocksprings and simple forms. Rockwell hardness will correspond to C 51 to C 48, C 48 to C 45, and C 45 to C 41, in the normal three hardnesses available to the commercial users as a standard article. Material has a modulus of elasticity of 30,000,000. Tensile strength varies with the hardness and thickness from 310,000 psi at 0.005-in. thick with the highest temper to 190,000 psi at 0.065-in. thick with the lower hardness.

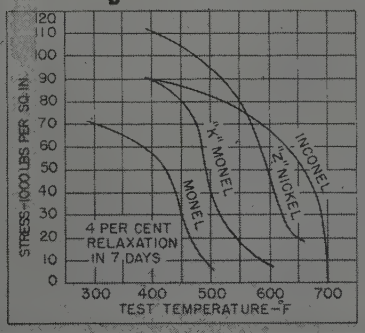
Many ordinary clock springs are stressed to 200,000 psi in thicknesses of 1/16-in., while 0.010-in. thick springs carry 250,000 to 275,000 psi, when wound up tight. For an ordinary cantilever spring of finite life, a stress of 180,000 psi can be employed. If a spring must give infinite life, the endurance range varies with thickness. When the springs are to be subjected to heat, stresses must be lowered as the temperature increases, until above 400° F, the stress becomes so low as to render springs useless from this steel

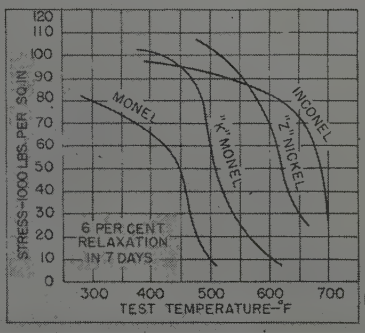
Stainless steel of the 18-8 type is employed in flat springs. This material will, if heated to 825° to 900° F after forming, resist the effects of heat much better than carbon or alloy steels. Material will have a hardness range of 38 to 41 C and a possible tensile strength of 180,000 to 200,000 psi in the thinner sizes. It will respond to shot peening, and where the shape of the part will permit this operation, fatigue life will be increased thereby. An electro polishing on either unpeened or peened parts will cause a lowering of the endurance limit by about 10 per cent of the endurance range, while a nitric acid passivation will do less than one-half of this amount of damage.

Round Wire For Springs: Cheapest wire for mechanical springs is hard drawn wire. Detailed specifications for this material are listed by ASTM A227-41; or SAE 1066 gives the chemical composition. This material obtained under a carbon content of 0.60 to 0.71, a manganese content of









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By F. P. ZIMMERLI
Chief Engineer
Barnes-Gibson-Raymond Division
Associated Spring Corp.
Bristol, Conn.

Materials

Final choice of ferrous or nonferrous metals depends upon close appraisal of job a spring is expected to do. Some diversified flat and wire materials used by the mechanical or cold forming, and heavy or hot forming spring industries are analyzed by the author

at least 0.80, and drawn to definite physical strengths, will be satisfactory for unimportant springs.

One of the most common mechanical spring materials is called oil tempered spring wire. It can be purchased to ASTM Spec. A229-41, and will be about SAE 1065 analysis. This wire is made by drawing a "patented wire" rod 3 to 4 passes, resulting in between 50 to 70 per cent reduction in cross section, and then heat treating this worked product. The word "patented" in connection with wire means in simplest language continuously annealed.

To patent a wire, the material is run through a controlled heating and cooling zone. Wire is heated above the critical range and cooled at a rate fast enough to produce a sorbitic structure. Usually several strands of wire are continuously pulled through a heating zone, for example a lead pot or furnace, and cooled in lead or under a bed of pulverized coke. The fine sorbitic structure will draw through the dies and the wire will be round and uniform, whereas a coarser (pearlitic) structure will not draw evenly.

Speed at which wire moves is adjusted with both heating and cooling temperatures to attain the desired structure. The heat treatment consists of continually passing the wire through a heating medium, for example a lead pot 20 to 25 ft long, then into an oil quench from whence the wire enters a drawing (*Please turn to Page* 108)

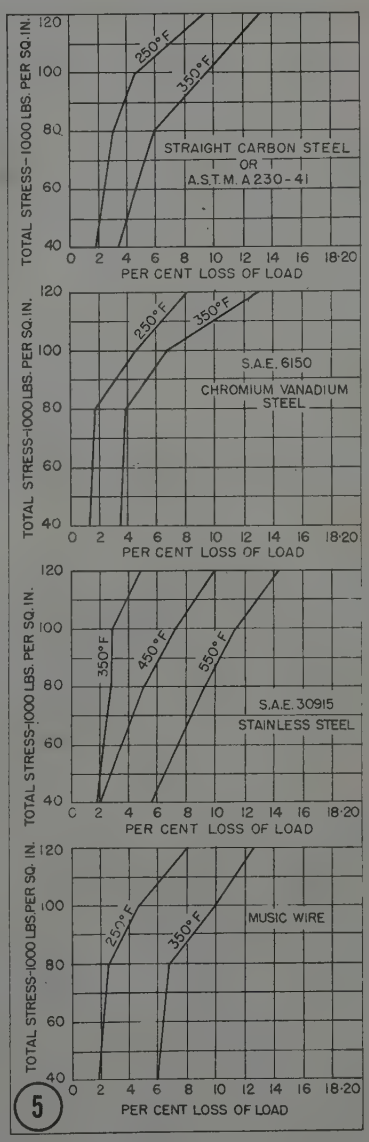
Fig. 1 — Stress range of pretempered wire. Stress corrected by Wahl factor

Fig. 2 — Safe endurance limits for 0.70 to 0.80 carbon flat springs (rockwell C 45-48) tested as cantilevers

Fig. 3 — Load loss data on high speed steel rockwell C 56-59

Fig. 4 — A-Stress required to produce 2 per cent relaxation of Monel, K Monel, Z nickel and Inconel; B-stress required for 4 per cent relaxation; C-stress required for 6 per cent relaxation

Fig. 5 — Curves showing load loss at various temperatures and stresses



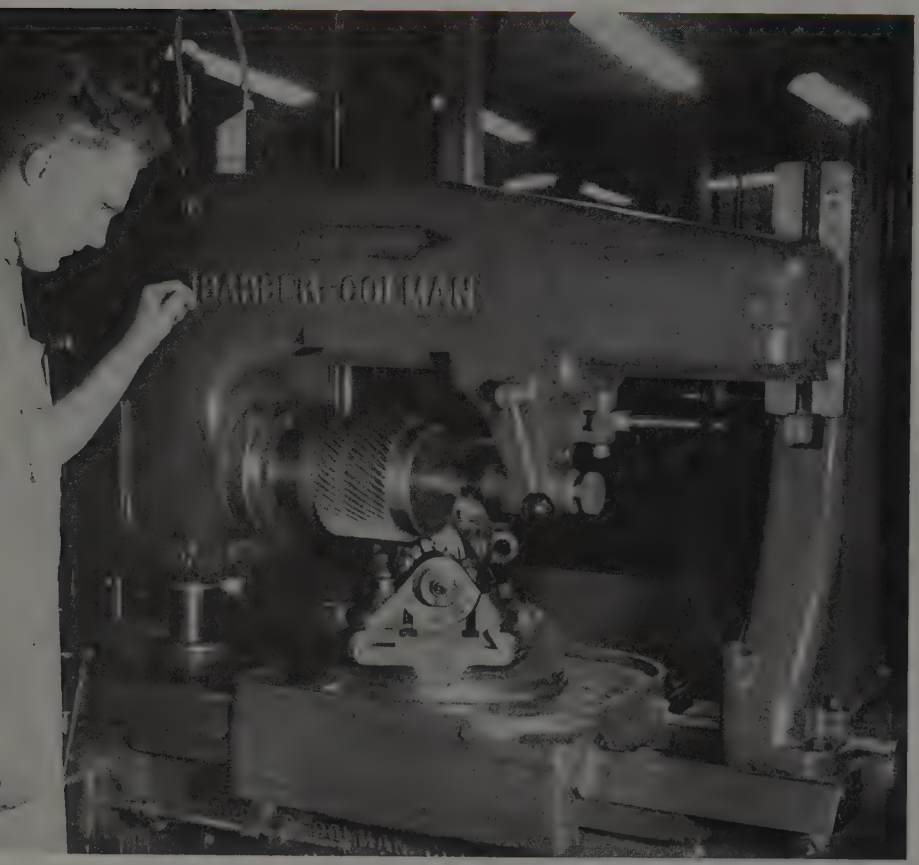
5

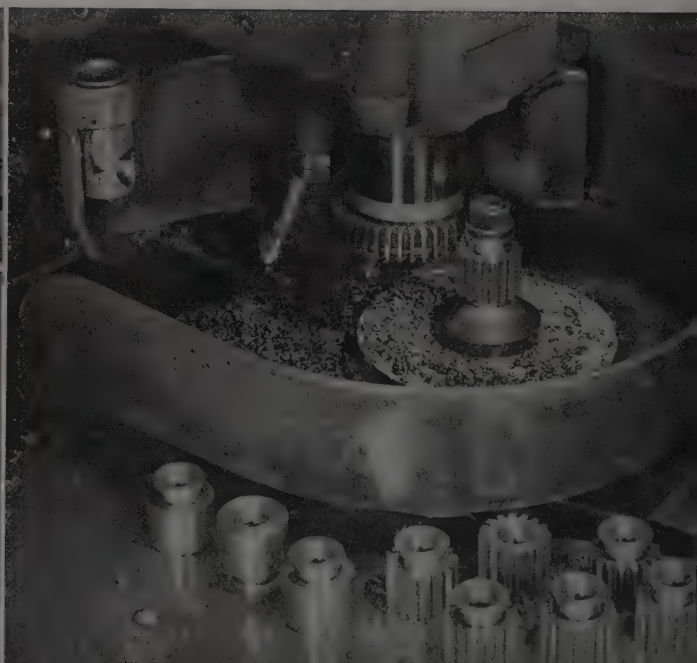
GEAR MAKING...

Part Ten of a Series, this One Being in the Nature of a Tribute to Those Mathematicians, Inventors, Engineers and Tool Experts Who Have Made the Gear Industry What It Is Today—with the Help of

MODERN MACHINE TOOLS

By GUY HUBBARD
Machine Tool Editor, STEEL





FOR ten years I have been faithful in attendance at annual and semi-annual meetings of the American Gear Manufacturers Association, founded in 1917 as "The Engineering Body of the Gearing Industry". Little did I realize how little the majority of us really know about gearing—and how much there is to know about gearing—until I came into the influence of the best brains of the gear industry through AGMA.

One of my prized possessions is a copy of "A Treatise on Gear Wheels", written and originally published by George B. Grant, founder of the Philadelphia Gear Works, in 1899. This was presented to me by Russell C. Ball, president of the company just mentioned and a past president of AGMA. In his introduction, Mr. Grant says: "To most mechanics 'a gear is a gear'—

'A yellow primrose by the shore,
A yellow primrose, was—to him,
And it was nothing more'.

"But", adds Mr. Grant, "if the mechanic will look beyond the tips of his fingers, he will find that it can be something more; that a gear is one of the most interesting objects in the field of scientific research—and by no means the simplest one; that it has received the attention of many celebrated mathematicians and engineers; and that the study of its features not only will add to his practical knowledge but also to his entertainment."

Writing in 1915, Joseph Wickham Roe, noted industrial historian with whom I have had the privilege of working on a number of research projects, made the following statement: "The application of scientific forms (epicyclic and involute curves) for gear teeth, coincided with the general development of machine tools beginning about 1830. No phase of modern machinery owes more to pure theory than does the gearing practice of today."

These statements by Grant and Roe are infinitely more significant today than they were in 1899 and 1915—especially in regard to refinements in gear manufacture, even though basic theories of gearing annunciated by Robert Willis, professor of natural philosophy, Cambridge University, as early as 1840, remain essentially unchanged.

In 1899 gears with uncut cast teeth still were in common use in woodworking machinery and even in some machine tools. In 1915 cast iron gears with cut teeth were used in most machine tools; the steel gears used in automobiles caused headaches both because of their noisy operation and their lack of dependability; helical and herringbone gears had been developed theoretically far ahead of ability of the industry to make them dependably and at reasonable cost; gear tooth grinding—like thread grinding—was a "laboratory process"; and gear tooth shaving was yet to be heard of as a production operation.

In other words, if mechanisms of World War II, had to depend upon the kind of gears which commonly were available at the time of World War I, our entire industrial, military, naval and aviation programs would have come to a crunching, grinding, crashing standstill.

In bringing about the tremendous improvement in quality of gears—and at the same time effecting decrease in cost of gear mechanisms—the machine tool industry has played a vital role. At the same time, improvements in gearing have revolutionized the design of machine tools. To get full import of that last point, one needs only to compare one of the few geared head machine tools of World War I vintage with any of the many geared head machine tools of World War II vintage—preferably in a quiet area.

Despite the relatively low power of the earlier machines, their gear trains were cumbrous, had undue backlash, were hard to shift and were a bit on the noisy side. The light, smooth-running gear trains in the modern machines are due to several factors, including better engineering, better materials and better manufacturing methods—with considerable emphasis on the latter factor.

Rule-of-thumb design, rule-of-thumb metallurgical methods, and rule-of-thumb gear cutting and finishing today are definitely "out" in connection with manufacture of gearing worthy of the name.

Inasmuch as this is supposed to be an article on gear making rather than gear theory, let us take a look at the record of what machine tool builders have done and are doing to translate the highly refined geometrical theories of the scientists into precise metal (and in some cases nonmetallic) products.

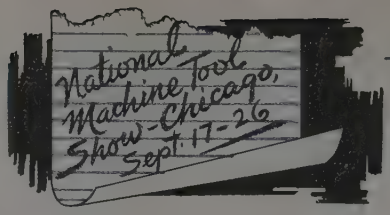
Index milling seems to have been the earliest production method employed for the cutting of gear teeth. The earliest milling cutter extant, now in the possession of the Brown & Sharpe Mfg. Co., was made by the French mechanic, Jacques de Vaucanson prior to 1782. It is a "formed rotary file" for finishing cast gear teeth. The formed milling cutter designed to retain shape of cut after

Opposite page, top—Typical production setup for hobbing helical gears for use in tractors—seven gears on the arbor being cut at one traverse of the hob carriage. Photo courtesy Barber-Colman Co.

Opposite page, lower left—Shaving teeth of a large diameter gear to assure true involute form and exact tooth spacing, tooth bearing, concentricity and helical angle. Cutter can be seen below the gear

Opposite page, center—Completion of straight spur gear in Fellows gear shaper, showing blanks and finished gears. Oscillating cutter first feeds in to depth, then revolves in mesh with gear as it "planes" the teeth

Left, this page—Pratt & Whitney formed wheel gear tooth grinding machine with wheel mounted on vertically sliding head. Action of this machine is similar to generator using rack tooth-shaped tool



Thirty-two years ago, Joseph Wickham Roe, one of the keenest observers of machine tool development wrote: "No phase of modern machinery owes more to pure theory than does the gearing practice of today."

That statement is even more true today. Since 1915, new methods of cutting, hardening, finishing and checking gears have been developed which overshadow previous methods.

All this has had profound effect on the machine tool industry. Seventeen member companies of the National Machine Tool Builders' Association—out of a total of 190—are heavily involved in manufacture of machines and tools for gear making.

Exhibits of gear making equipment obviously will be among the most important of all at the National Machine Tool Show, Dodge-Chicago plant, Sept. 17-26, 1947.

sharpening originally was invented by Joseph R. Brown of the above-mentioned company in 1864, primarily for gear cutting. Mr. Brown was an early advocate of the now widely used system of interchangeable involute gears.

Gear generating by the planing system was by no means unknown, however, in the early days. In 1920 I located interesting proof of this at the Fales & Jenks Machine Co., Pawtucket, R. I. That company was at that time still manufacturing the rotary gear pump patented in 1828 as the "Revolving Hydraulic Engine." To machine the rolling surfaces of the teeth of the pump gears, they still were using a form controlled, reciprocating single point tool, planing machine invented and built by the famous inventor, Alvin Jenks, in 1833.

This machine had automatic feed, lifted the tool on the back stroke and did surprisingly good work. Not only was it the "grand dad" of all gear generators but also it was the dean of gear cutting machines in point of service.

Machine tool historians today no longer make "finds" such as that. The world moves too fast now to allow either men or machines long to outlive their time in the physical sense, even though in many cases their spirits do go marching on in modern companies which have developed directly out of pioneer enterprises. For instance when President John Quincy Adams and Secretary of State Henry Clay signed the patent on the "Revolving Hydraulic Engine" on April 28, 1828, they "sparked" an industrial enterprise which lives on today as the Jones & Lamson Machine Co.

The late Edwin R. Fellows served as chief draftsman of that company just prior to the time when he struck out for himself in 1896 as manufacturer of the generating-type gear shaper which he invented, which bears his name and which for more than 50 years has been manufactured by the Fellows Gear Shaper Co. A working photograph of one of these machines very fittingly appears on the first page of this article, the action of its reciprocating gear shaped cutter being self-evident. Incidentally, this was one of the few truly basic machine tool inventions and one which literally sprung "full-fledged" from the brain of its inventor.

In the old days the types of gear products in common use were limited primarily to spur gears and racks whose axes were parallel, straight bevel gears and pinions with axes intersecting, and single and multiple thread worms and worm wheels whose axes were nonintersecting. Various other types, such as the Hindley hourglass worm and stepped spirals (Hooke's gears) were known but were little used. Machine designers stuck closely to the fundamental types because they understood them and because they were readily available.

It was not until the advent of the internal combustion automobile with its problems of transmitting large amounts of power quietly and dependably through compact gear mechanisms, that widespread interest was aroused in helical gearing, herringbone gearing, skew bevel gears, spiral bevel gears, hypoid bevel gears, Cone's improved hourglass worm units, and various other "exotic" types.

When the automobile industry sets its collective mind on something, it takes more than ordinary technical, manufacturing and operating difficulties to thwart its ambitions. This has been particularly true in the gear business. Men of the caliber of Earl Buckingham, Charles Kettering, John Almen and their associates worked out the theoretical problems, then went after the practical ones including development of stronger materials, better methods of heat treating, better bearings and extreme pressure lubricants.

They spurred on the production engineers to lick the manufacturing problems involved (*Please turn to Page* 90)

Example of modern gear tooth checking equipment combining features of laboratory apparatus and heavy machine tool design. This is routine checking of a helical drive pinion at Nuttall Works of Westinghouse

Centralized OIL RECLAMATION and DISTRIBUTION

System in use at International Harvester's West Pullman ball bearing plant proves both economical and efficient. It not only handles all required oils for cutting, quenching, flushing and grinding, but assures constant delivery of clean lubricant to all operations at a pressure that is constant

ONE of the important functions in running a modern ball bearing plant—such as the West Pullman Works of International Harvester Co., Chicago—is keeping a constant supply of oil centered at the various operations. Not only must the lubricant be supplied, but it must be clean, distributed in abundance and at steady pressure.

At International's plant, four types of oil are constantly fed to four key operations. Automatic screw and chucking machines take a great deal of cutting oil; quenching tanks in three heat treating lines use much quenching oil; bearings are flushed with mineral seal oil and grinding operations are cooled with soluble oil coolant. In these operations constant supply of oil is a problem that rates A-1 priority.

Problem is met here by a centralized reclamation and distribution system which thus far proved itself to be both economical and efficient. It not only handles all of the oils, but assures a continuous delivery of clean fluid at a constant pressure, decreases downtime and reduces maintenance costs.

Located in the southeast corner of the ball bearing building, which was completed in 1944, the reclamation system is centered in a pit 4 ft below the floor level and occupies an area 5700 sq ft. Centered in this area are the multiple electrically-driven pumps which propel lubricant through various filters and distribute it throughout the building; chutes that handle screw machine turnings from which cutting oil is extracted and tanks in which thousands of gallons of oil are stored. Just above the pit, on the roof, is the cooling tower which is used to maintain quenching oil at the proper temperature.

From the pit run networks of both overhead and under-the-floor pipes, through which oil circulates in a never ending cycle. Beneath the pit are tanks with capacities of thousands of gallons.

Methods of reclaiming and distributing various types of oil are worthy of detailed discussion, for each system is the "last word" in efficiency.

In the case of the oil used in automatic screw and chucking machines, the cutting fluid is delivered to the plant by tank car, and unloaded into a 12,000 gal storage tank by gravity pipe line. When filling or replenishing the operating system, a 5 gpm pump transfers the oil from the 12,000 into a 6000 gal filtering tank. In pumping the oil under pressure to the machines, two 7.5 hp motor pumps are used to drive the oil at a rate of 140 gpm. Because all cutting oil replenishing is done at long intervals, a ½-hour period at the beginning of each shift is designated for this chore.

In screw and chucking machine operations, steel turnings from each machine, to which cling a large amount of oil, drop onto an individual chip conveyor. This re-

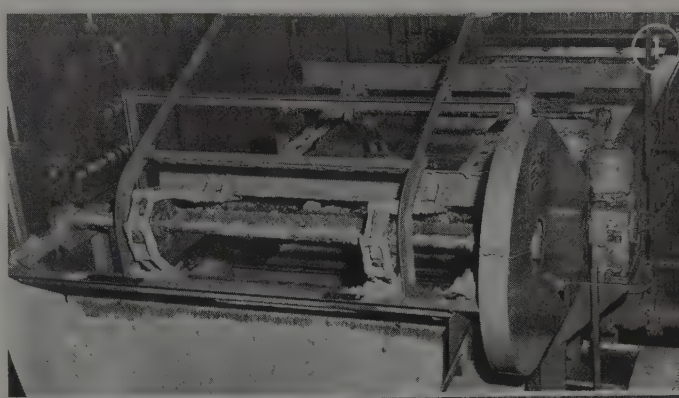


Fig. 1—Drag type conveyor removing sludge from soluble oil coolant filtration unit

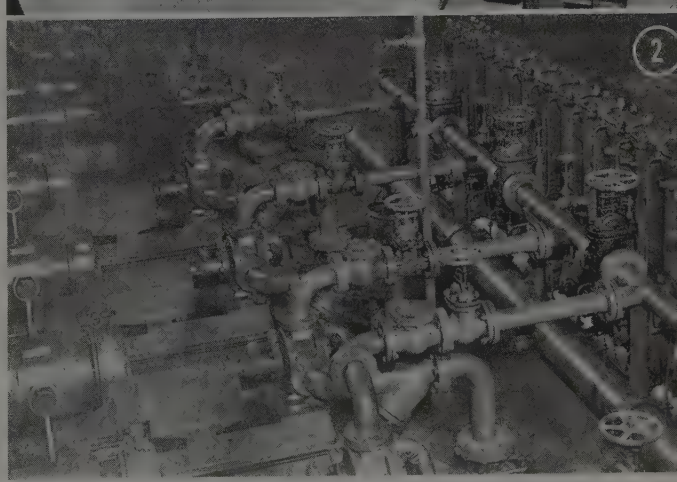


Fig. 2—Mineral seal oil filters. Filters are shown at right. At left are pumps which supply filters. Filtered oil supply pumps are shown in background

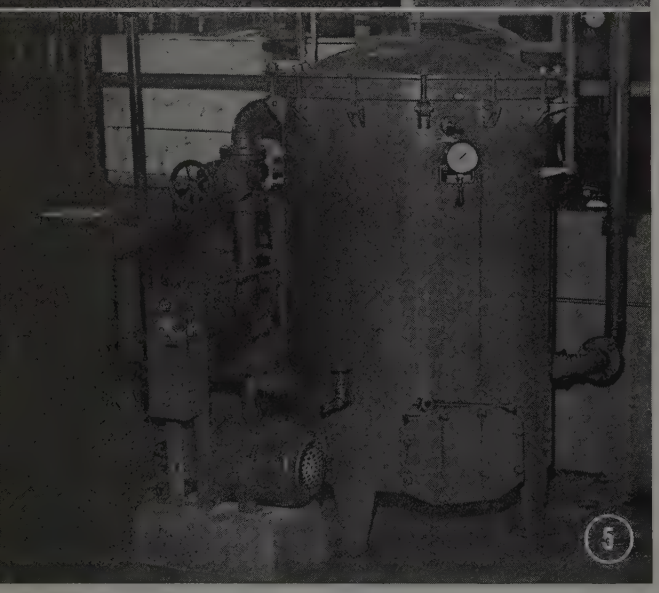


Fig. 3—General view of reclamation area. Extreme right, sludge discharge chute of one of two soluble oil coolant tanks. At left is conveyor which delivers turnings to extracting tanks. Mineral seal oil filters in background

Fig. 4—Turnings at reclamation area. Oil drains from conveyor to tank in pit at right

Fig. 5—Filter unit for cutting oil. Small tank at left is "charged" daily with cellite. Pipe, extreme right, carries filtered oil to 6000-gal tank

moves the chips from the machines and transfers them onto a master conveyor traveling beneath the floor level for the entire length of the building. The conveyor delivers the turnings to a drain pit located in the reclamation area, and as they are being conveyed, the oil drains through screens on each side of the conveyors. From there it is piped into a 2000 gal tank—the same tank into which oil from the drain pit flows.

Turnings are than loaded into a basket and centrifuged at 700 rpm—the force of which dislodges additional oil. This fluid then drains by gravity into the same 2000 gal tank in which the conveyor and pit oils have accumulated, and all of the oil is then emptied into the tank on one side of a baffle. The oil at this point, however, is not ready for use, as it still contains fine chips and particles. As it rests in the tank, particles and chips settle at the bottom. When more reclaimed oil is added, the settled lubricant runs over the baffle into the other side of the tank and is allowed to accumulate until the tank is practically full. Once the tank is at this stage, a 100-gpm pump forces the oil through a filter "charged" with cellite—a compound that coats the filter screen and aids in filtering. As the oil is filtered the level in the tank is lowered. A switch system, controlled by a float on the oil, operates a hydrometer-controlled gate valve in the discharge line of the filter. When the oil level in the tank reaches the predetermined mark, the hydrometer closes the gate valve, thus preventing the tank from being pumped dry. It is not necessary to run the filtration unit continually with this system, and a constant supply of oil in excess of the machine requirements is assured. If the filter unit is in operation and the clean oil tank is filled to its capacity of 6000 gal, a by-pass enables the excess clean oil to return to the unfiltered tank.

Tests show that approximately 33 gal of cutting oil are reclaimed each hour, which proves the efficiency of the method.

In cooling bearing races which have undergone heat treatment, an oil quench is necessary. To maintain proper temperature and supply conditions in the oil bath, the following system is employed:

Quenching oil also is delivered in tank cars and is emptied into a 12,000 gal storage tank, which supplies a 6000 and a 2000 gal tank in the operating, pumping and cooling system for the furnaces. Two 7½ hp motors each drive a 300 gpm pump in pumping the oil at constant pressure from the 6000 gal tank to a 4000 gal quenching tank at each of three furnaces. Oil demand is regulated by the amount necessary to control the temperature of the oil within the bath at between 140 and 150° F. Oil level in the bath is controlled by an overflow pipe. As cool oil enters near the bottom of the tank, warm oil overflows at the level and returns.

During quenching, in order to have a constant dissipation of heat from the quenched part, either the part must be moved through the liquid, or the liquid must be moved over the part. Therefore, an oil circulating system also is incorporated in the quenching bath. The oil is constantly agitated by pumps to offer a constant cooling environment for the parts, eliminating possibility of improper quenching.

As the oil overflows at the oil level of the tank, a gravity return pipe delivers it to a 2000 gal sediment tank. Here, the oil flow slows, (*Please turn to Page* 105)

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor, Steel

NO IRON CURTAINS: Since last I tackled the job of writing this page, I have been on two "whirlwind tours" —one in New England, the other through the Michigan-Wiscousin-Illinois territory. Yes, New Englanders do get around, despite all myths to the contrary. The fact that I wrote the page previous to this enroute to Boston, doesn't mean that Boston is the center of the "machine tool universe."

I must admit, however, that there are some mighty good machine tool builders in the orbit of Boston. They have to be good to keep up with their fellow-craftsmen in Cleveland and Cincinnati and Detroit and Milwaukee and Madison and Fond du Lac and Rockford and Chicago and more than 50 other places outside New England where good machine tools are being built in 1947.

One of the most dangerous forms of provincialism in business is that idea that there are geographical limits to skill and ingenuity in any industry. Years ago there was a tendency for specialized group of technicians to develop in certain centers — as the early New England machine tool builders did around the early firearms plants. It is perfectly natural that where a lot of people in one place concentrate on one line of business, they and their sons and grandsons get pretty good at their specialty. That is true not only in New England, but also in Cincinnati or Rockford or anywhere else.

If these men like to live in the particular locality, if the working conditions are good, if the company keeps up with the times in designs and selling methods—and above all, if it recognizes the strength of any and all competition —there is no reason why it cannot continue until the end of time. A number of such companies have entered their second century with all signs of vigor—and not all of them are in New England.

On the other hand, if any company in Boston or Cincinnati, Rockford or anywhere else has the idea that a sort of "iron curtain" surrounds its "know how" based on years of experience, they are putting faith in something which simply doesn't exist. Any company which attempts to set up an "iron curtain" keeps out more good ideas than it keeps in, and only inspires good men to escape to other fields where they will not be fenced in either in the physical or mental sense.

Freedom of circulation of men and ideas is one of the basic reasons for the strength and the extent of American industry.

RIGGERS ARE AT IT: The unsung heroes of the National Machine Tool Show, in my estimation, are the riggers and movers who are faced with the task of setting 2000 machine tools in place in the huge Dodge-Chicago plant between August 4 and September 16, and removing them promptly thereafter.

Machinery riggers and movers are in a class by themselves—their closest relatives probably being seamen of the era of sailing ships who knew all about ropes. Be that as it may, these men who move heavy machinery certainly "know their ropes" in that they know instinctively how much any cable or sling will stand, how to tie knots and make splices, where to fasten ropes and slings, how much a machine can be tilted safely, how to rig "shears" for lifting, and a hundred-and-one other important things which just can't be found in books or learned in schools.

In my time I have been around heavy machinery a great deal, and at times have found myself facing hoisting and moving problems which stumped all of us whose business was making machinery rather than moving it. When the professional movers arrived, they sized things up with practiced eyes, unloaded a collection of timbers and tackle and before we knew it "the mountain had come to Mahomet."

WHO WAS SPENCER? In a number of instances recently, I have mentioned the name of Christopher Miner Spencer. As a result, I have received the following inquiry from a reader of STEEL, "Who was this man Spencer to whom you often refer?"

Christopher Miner Spencer (1833-1922) was one of the greatest and most picturesque and most loveable characters of the machine tool industry—whose active career extended from his "graduation" from a machinist's apprenticeship in 1849 almost down to the day of his death on January 14, 1922.

Born in South Manchester, Conn., June 20, 1833, he learned his trade under his grandfather, who had repaired George Washington's horse pistols during the Revolutionary War. He worked at the Colt Armory and for Cheney Brothers, for whom he invented a spooling machine which was the first machine built by Pratt & Whitney.

In 1860 he invented and patented the famous Spencer Repeating Rifle, which he personally demonstrated to Abraham Lincoln—with whom he engaged in a shooting match. Over 100,000 of his guns were used in the Civil War.

In 1868, in partnership with Charles E. Billings—a fellow workman at the Colt Armory—he founded the Billings & Spencer Co. of Hartford, where he developed board drop hammers and forging processes. His name is still perpetuated in that well-known company.

In 1873, Mr. Spencer inveted the automatic screw machine and in 1876—with George A. Fairfield—he founded the Hartford Machine Screw Co. to manufacture screws with his automatics. That still is one of the largest industries in Hartford.

Between 1880 and 1912, he invented the "pump" shotgun, several new automatic screw machines, and steam automobiles. From 1912 to his death in 1922 he was mechanical engineer of the New Britain Machine Co., whose original six-spindle automatic he invented. He was a great man, and one I am proud to have known.

By G. W. BIRDSALL
Reynolds Metals Co.
Louisville

IN ADDITION to fluxing, a number of other methods of removing impurities from the molten metal bath have been tried and used with more or less success in secondary aluminum operations. These include overheating, standing, slow solidification, use of an inert gas, use of an active gas. The latter two are also known as "gas" fluxing to differentiate between the addition of solid salts in the ordinary fluxing operations described above.

Overheating increases the fluidity of the molten metal, thereby allowing suspended matter to rise or sink more easily. Increasing the bath temperature from 1300 to 1650° F will increase the fluidity some 30 per cent. The metal is usually heated, allowed to stand quietly, then reduced in temperature for pouring. Chief objection is

Gas

the greatly increased tendency to absorb gas, resulting in blistering when annealing sheets, etc.

Standing has as its object the removal of sonims (solid nonmetallic particles) and dissolved gases. To remove sonims, they both may be held from 3-24 hours or more at a temperature considerably above the melting point. Dissolved gases are removed by holding at a temperature near the melting point. Both objects can be accomplished by holding for successive periods at each of the two different temperatures required.

Slow solidification is used primarily to remove dissolved gases, although some sonims may also be taken out. In this process, the metal is cooled slowly in the furnace until it has just frozen. Then it is remelted quickly and immediately poured. The idea behind this scheme is that dissolved gases are liberated during solidification. By prolonging solidification sufficiently, the bulk of the dissolved gases can thus be removed.

An inert gas also may be utilized by bubbling it through the melt, the mechanical agitation so provided being useful in removing both sonims and dissolved gases. Dry nitrogen is the inert gas usually employed in this method. Its fumes are nontoxic and it does not attack the perforated metal pipe or other tool used to introduce it into the bath. Passing nitrogen into the bath immediately produces an accumulation of dross or skim on the bath surface. Pressure used is just enough to produce a gentle bubbling action. Bath temperature should be low and length of treatment short to avoid absorption of nitrogen by the aluminum.

Combinations of the above treatments are often employed. The nitrogen treatment may be combined with slow solidification. Or overheating and standing may be followed by use of nitrogen. A catalytic agent may also be used to help upset the equilibrium between the aluminum and dissolved gases.

An active gas such as chlorine is preferred by many users because it combines a powerful chemical reaction with the mechanical agitation obtained with nitrogen. One of the most chemically active of all the elements, chlorine is very effective in removing both sonims and dissolved gases.

Chlorine Reactions: Precise chemical reaction of chlorine in the bath is not entirely clear. There appears to be some preferential action. Hydrogen, for example, seems to be attacked more readily than other gases, forming hydrochloric acid which escapes by volatization. At the

Fluxing

In Production of Secondary Aluminum

In this second and concluding article, the author describes various methods for refining aluminum scrap, including a complete installation for utilizing liquid chlorine direct from tank cars

Fig. 5—Standard routine for reclaiming aluminum from obsolete and battle damaged aircraft called for flying planes to landing area, dismounting propellers and removing engines by cutting through supports with torch as shown here

Fig. 6—Gondola of heavy aluminum scrap scheduled for remelting

Fig. 7—After dumping scrap on charging platform, furnace door is raised and scrap pushed into furnace by ram which fits over forks of industrial power truck

same time compounds formed and volatized in the bath provide a strong stirring action, increasing the mechanical agitation of the bath and so helping the removal of impurities by that means.

In fact, chlorine has been found so effective that no other fluxing or refining agent is utilized at Reynolds Louisville plant 5 when producing the high quality metal shown in Table II (STEEL, Aug. 4, p. 115). Note that the analyses ranges shown in this table reveal that magnesium content can be reduced greatly where magnesium is not wanted. In some instances, the presence of quantities of magnesium is undesirable and the ability to control the magnesium content in the reclaimed metal is therefore of importance.

Since this installation for utilizing liquid chlorine direct from tank cars in the production of secondary aluminum was the first of its type, a rather full description may be of interest. It represents developments which have now been adopted by other Reynolds plants.

Chlorine is run directly from tank cars to furnaces. The entire installation was designed and built at plant 5 in co-operation with Pennsylvania Salt Mfg. Co. Here six furnaces use about a tank car of chlorine each week.

Confirming the experience of other large users of chlorine in the chemical process industries, Reynolds has found its use to involve no serious health hazard. Of course, traces of chlorine in the air can be irritating to human beings and for that reason there at first was some hesitancy in using chlorine in commercial furnaces. However, sound engineering of handling equipment and safety practices proved highly effective and no trouble was encountered.

Liquid chlorine arrives at the plant in insulated tank cars of 30-ton capacity under a pressure of 80 to 90 psi. The top of the car has four valves, two being gas or blow-off valves venting the very top of the tank, and two connecting to lines ending near its bottom. These two are used for drawing off the liquid chlorine. Connection is not made to either of the gas valves because withdrawal of gaseous chlorine would quickly reduce the tank car pressure and make unloading of the car contents very difficult.

A railway siding used exclusively for chlorine cars and provided with a locked switch and derail accommodates two tank cars so when one empties, another is at hand for immediate use. The 200-ft line from tank cars to evaporator unit is fabricated from 1-in. extra heavy steel pipe with welded joints. It is buried underground. A tank car connects to this line through a 10-ft length of flexible high-pressure copper tubing, a valve, a pressure gage and a line valve.

Connections at evaporator and in-lines to furnaces are made with ammonia type, two-bolt tongue-and-grove flanged unions with lead gaskets. Fittings are forged steel, rated at 600 lb. Furnace flow control valves are ¾-in. standard Chlorine Institute ton container type. Main line cutoff valves are Crane No. 1644. Gages are of the protected type with silver diaphragm.

Vapor pressure from the chlorine in the tank car is above critical pressure for liquefaction, and maintains the line at 70 to 90 psi which is more than ample to force the liquid through the piping system and to inject it into the molten metal bath. A final complete drop in pressure at the gage alongside the tank car shows when the tank is empty. Inventory records of reclaimed metal provide a weight check on quantity of chlorine used. The evaporator is on the main furnace floor in a small booth to one side of the furnaces. It is at approximately the same elevation as the tank car.

The evaporator consists of a 5-ft length of 8-in. diameter extra heavy seamless steel tubing mounted inside a 3-ft length of 14-in. tubing, to make a 3-in. water jacket between the two. A heavy tongue-and-grooved blank flange is fitted to the bottom of the 8-in. tubing to facilitate inspection and cleaning. A rupture disk is connected at the top as a safety, this being a 2-in. diameter silver disk rated to blow at 225 psi. The space between the two lengths of tubing has water pumped through it continuously from a 50-gal tank alongside; this water is maintained at 150° F by four 6-kw immersion type electric strip heaters installed in the 50-gal tank. Current is controlled by thermostat, and a makeup device automatically maintains the water level.

As heat is supplied to the liquid chlorine flowing into the bottom of the 8-in. tubing, it evaporates and flows out into the furnace line at a pressure of 60 to 70 psi. Evaporator, water heater and all gas lines are carefully insulated with a 7/8-in. coating of 85 per cent magnesia. From the manifold at each furnace, flexible hose connections carry the gas to the discharge tubes which reach to the bottom of the metal bath. The strong stirring action that results as the gas bubbles up to the top is important. It eliminates the need for mechanical stirring. Discharge tubes are of

(*Please turn to Page* 104)

Fig. 8—Molten aluminum metal is tapped off in 5000-lb lots and poured into molds

Fig. 9—Reclaimed aluminum ingots

Let Trouble be our Introduction

THERE'S nothing like trouble to bring people together. That's how some of Revere's closest friends were gained—through a mutual struggle against difficulties, troubles such as occasionally beset any business.

Take the case of an important product, originally developed for war uses, now finding many applications in peacetime services. When manufacture began, rejections ran extremely high, over 40%, costs were skyrocketing, and badly-needed production was being lost. The maker asked if we would care to collaborate in solving the problem. Of course we would! After studying the subject in detail (and also under conditions of the greatest secrecy), we suggested a radical change in the properties of a non-ferrous metal used in the manufacture of the vital part with which so much trouble was being experienced. New processes of manufacture were developed, and in a short time test runs of the recommended material proved successful. Rejections of finished units dropped to less than 1%. Thus an expensive and vexing bottleneck was broken, and we gained a new customer and a firm friend.

This success story demonstrates that Revere has an open mind as well as an informed one, and is always ready to question the customary, find new answers to new problems, or to old ones, for that matter. If something is worrying you in your employment of non-ferrous metals, get in touch with Revere, not for ready-made answers, but for wholehearted cooperation, a joint search for better results. This help is given freely, without obligation, through the Revere Technical Advisory Service, which has at its command the knowledge and facilities of our laboratories, and the accumulated experience of the entire Revere organization.

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Gear Making

(*Concluded from Page 82*)

and the production men in turn have needled machine tool builders and cutter manufacturers to come through with new and better gear cutting and finishing machines, cutters and methods. All this has led to a lively competitive race between new machines and methods which still goes on with undiminished intensity, leaving no time for complacency among the members of the gearing fraternity.

The typical industrialist of 25 years ago would scarcely recognize a production gear department today. While he would recognize the gear shapers, he would find many of them operating with a twisting motion enabling them to cut spiral and herringbone gears. Also, he would find those of smaller size running at speeds comparable to the wings of a humming bird. Then too, he would find the familiar gear shaper cutters being used to cut worms in machines which revolve the blank and roll the cutter lengthwise of the blank.

Modern Gear Techniques

He would find the hobbing process very much in evidence, in the shape of horizontal, vertical and multi-station machines, to some of which carbide-tipped hobs are being applied with success on steel, nonferrous and fiber gears. He would find roughed out gears being finished to extremely close limits of form, fit and finish by the use of shaving cutters, burnishing, lapping, and by generating grinding or formed wheel grinding.

There would be cases where he would find internal gears of considerable size being completed at one pass of huge broaches costing several thousand dollars each. On some equally large quantity spur gear jobs he might find all teeth likewise being cut at one time and at few passes by unique vertical machines in which the blanks are reciprocated up and down through a ring cluster of planing tools which close in radially until they have reached full depth.

He would find new methods of hardening including flame and electrical induction hardening, operating in the production line, keeping pace with it, and doing the work with little or no distortion and without scaling. He likewise would find gaging and inspection devices keeping pace with production as they check all vital phases of tooth form, dimensional accuracy and finish—in some cases making graphical or photographic records.

Furthermore, he might find some gears being produced by methods other than cutting—instrument gears by die casting or plastic molding and pump gears by the powder metallurgy technique.

Just how great a stake the machine tool industry now has in the gear industry, is indicated by a few facts and figures which I have gathered from study of the membership of the National Machine Tool Builders' Association and products of those member companies.

Current records show that of the 190 member companies, 17 manufacture machines, tools, gages and testing equipment directly concerned with gear making.

Of the 17 companies directly involved with the gear industry, at least eight make this their major activity.

The list of gear making machines, tools and accessories produced by the 17 companies truly is a formidable one. It is indicative of the growing complexity of the gear business, in that many of the items were unknown only a few years ago.

A few of the items of equipment are: Hobbing machines—horizontal and vertical, single and multiple spindle; milling-type gear cutters—single and multiple spindle; gear shapers—spur and helical, regular and high speed, circular cutter and rack-type; gear, spline, rack and worm grinders; worm generators; straight, spiral and hypoid bevel gear generators and finishing machines; gear shavers; gear lappers; gear burnishers; burring and chamfering machines; surface hardening machines; quenching presses; hobs; milling cutters; gear shaper cutters; sharpeners; and a bewildering array of checking and testing machines for cutters and gears.

Quick Glances at Machine

Any attempt to illustrate an article as brief as this about such a vast field of machine shop practice as modern gear making can at best represent only quick glances at a few phases. For example, in the heading on the first page appears an action photograph of a typical production hobbing operation as carried out on helical gears in a middlewestern tractor plant. Setups such as this are numerous in the automotive and agricultural machinery industries.

In this Barber-Colman horizontal spindle machine, seven blanks are handled at one setting and are cut at one traverse of the saddle carrying the hob spindle. Hob and blanks revolve together, their ratio depending upon number of teeth in the gear and number of "starts" on the hob. Thus a single thread hob revolves 20 times per revolution of a 20-tooth gear. The teeth of the hob in effect are a series of rack teeth wound around a cylinder. This is a fast method with regular hobs, but with new carbide-tipped hobs some of the runs I have seen lately are truly sensational in terms of cutting time per gear.

Within recent years shaving of gears as a finishing process where the material is within machineable limits has come to the fore as a follow-up on hobbing, shaping, etc. A simple setup for shaving helical gears is shown at the lower left of the first page of this article—the nature of the shaving cutter, located below the gear, being clearly evident. Cutting takes place as the gear moves axially somewhat more than its face width, in the meantime running at high speed in mesh with the cutter.

Sharp shaving edges of the gashes in the hardened involute cutter remove minute chips, giving bright finish, true involute profile, correct spacing, concentricity, tooth bearing and helical angle. If roughing is reasonably accurate, only 20 to 40 sec are required for the average shaving job.

Next to the shaving setup is the Fellows gear shaper setup on straight spur gears which already has been mentioned. Blanks and finished gears are shown here.

Grinder Handles Big Gears

At the bottom of the second page is one of the large Pratt & Whitney gear grinding machines in action. This machine is grinding a spur gear 26 in. in diameter, using a formed grinding wheel with a motion like that of a vertical shaper. Relative motions of the rotary work table and cross sliding carriage carrying this table determine the rolling or generating pitch diameter of the work. The V-form to which the wheel is dressed simulates a rack tooth of desired pitch. This machine handles straight or helical gears up to 30 in. diameter.

On the third page is shown a routine helical pinion checking operation as carried out at the Nuttall works of Westinghouse Electric Corp. This gives some idea of the complexity of the testing machines now in everyday use in production gear shops. Spur gears used in the drives of electric locomotives call for involute tooth curves within limits of plus or minus 0.0005-in., for example. Limits such as this are not too difficult today.

Some day, someone is going to write a complete history of gears and gear making. At a recent meeting of the American Gear Manufacturers Association, Allan H. Candee, mechanical engineer, Gleason Works, Rochester, N. Y., and Granger Davenport, assistant chief engineer, Gould & Eberhardt Inc., Irvington, N. J., discussed such a project with me.

If I knew as much about the subject as either one of those men know, I would be tempted to tackle the job.

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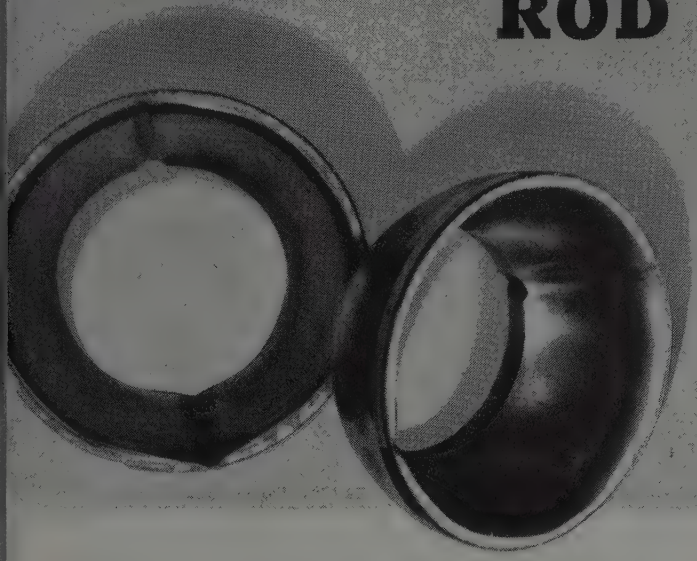

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Engineering News *at a Glance*

INCLUDES NEW STEELS: "Hardenability of Alloy Steels", published jointly by the Society of Automotive Engineers and American Iron and Steel Institute, provides complete and current data on designing, testing and ordering of steels by hardenability-band specifications. It covers 62 tentative hardenability-band steels, 25 of which appear for the first time. Treatise is pointed to stimulate interest in selecting and buying steels by hardenability, now regarded as superior to chemical composition because of the close relationship between hardenability, physical properties and ultimate satisfactory performance.

BACK IN PRODUCTION: In York, Pa., the sheet metal fabricating plant of York-Shipley Inc., damaged by a spectacular fire June 27, is now in full operation again. The oil-fired heating equipment maker was in partial production July 3, because of speedy cleanup and repair work, and in full production by July 10. Building in which the sheet metal operation is housed is occupied jointly by three other York concerns. York-Shipley, located in a section of the first floor, suffered minor damages in contrast to the other occupants. Most of it was confined to the parts storage section on the second floor. Quick work on the part of the company's personnel in greasing machinery and metal inventory items after the fire prevented further damage and enabled the machinery to be placed in working order soon after the building was roofed.

LENGTHENS TOOL LIFE: Longer tool life and improved finishes are reported by several industries co-operating with Sun Oil scientists in testing cutting oils made with a new ingredient called Petrofac, the oil company revealed recently. The ingredient, made entirely from petroleum, eliminates use of animal and vegetable fats in the cutting oil formula. As a result both high-speed automatic machines and extremely heavy-duty equipment operate more efficiently and with fewer stoppages for tool resharpening. In addition, the oil cannot turn rancid or support bacterial growth.

FOILS "RAIDERS": Several new features are incorporated in the latest home freezers currently produced by Deepfreeze Division of Motor Products Corp., North Chicago, Ill. Unit construction is such that foods are "wrapped" in a blanket of zero cold from lid to base. Copper tubing is fastened to the exterior of the heavy gage steel liner, circulating the refrigerant and surrounding food compartment from top to bottom with constant low temperatures. The lid is counterbalanced to "float" up. It opens to any position and remains there. Inner lid is of lightweight plastic. Handle includes a tumbler lock to protect stored foods from children and other "raiders."

PROMOTES SMOOTHER BREAK-IN: Smoother break-in and reduced subsequent wear are provided on the tappets produced by Johnson Products Inc., by a process that places a crystalline, nonmetallic layer on the surface of the metal. Character of the process used by the Muskegon, Mich. plant, and its oil-holding qualities, prevent scoring and scuffing, allowing faster, smoother break-in of each tappet.

PARADES HANDLING DEVICES: In Grand Rapids, Mich., Rapids-Handling Equipment Co. is now rotating a demonstration truck through its various sales territories to give customers on-the-spot performances of ideal handling equipment. Besides aiding company salesmen dramatize their equipment recommendations, the traveling exhibit accomplishes an educational function by paving the way for acceptance of modern materials handling equipment.

PROPELLERS MAY STILL WHIRL: Research toward development of propellers that operate continuously at supersonic speeds, regardless of the forward speed of the craft on which they whirl, will be undertaken by the University of Illinois aeronautical engineering department, under a contract with Aeroproducts Division, General Motors Corp., Dayton, O. Problem, if successfully solved, would put the propeller "back in the running" for use in high speed planes well beyond the speed ranges for which it presently is considered useful.

USES BALANCED AIR PRINCIPLE: Instead of depending on pressure control only, line of air gages currently manufactured by Merz Engineering Co., Indianapolis, operate on the "balanced air" principle in which air is allowed to flow to atmosphere—both through the plug or accessory and also to a continuously variable orifice, the value of which is controlled by pressure changes. Thus the gages not only control air pressure, but also the volume of air flowing through them. When no work is presented to the air plug or accessory, a majority of the air flow is through the accessory; the moment the work is presented to the plug or accessory the air flow is reversed and most of the air flows through the variable orifice to atmosphere. Operation of a calibrated scale is made possible by an adjustment on the variable orifice by which proper initial pressure can be determined and returned to at any time. As both pressure and flow through the orifice is controlled, an extremely accurate means of determining upstream pressure is provided. Thus instead of just being a comparator, each of the gages is actually a measuring device.

SIMPLIFIES COIL SPACING: A motor expert with Continental Electric Co., Hawthorne, Calif., recently devised a concentric coil winding chart for use in making single-phase motor coils. Its use eliminates necessity of measuring stator slots in order to find coil widths. Knowing the air-gap diameter of the stator under consideration, one can obtain the correct sizes for the various coils in the group by referring to the tables on the chart—both for the starting and the running winding. According to the company, all guess work is eliminated along with the wasting of magnet wire.

MEET FINISHING SPECIFICATIONS: Automotive industry, with its tremendous demand for finishes on bodies, fenders, wheels and accessories provides the finest demonstration of which oven type best meets strict specifications laid down by leading paint technologists, the American Gas Association reports. In a recent survey of the Detroit district, it was disclosed that a total of 88 large continuous ovens of the full convection high-velocity external air heater type are in use in drying modern finishes. These have a connected load of 242,000,000 Btu per hour. Batch type and small continuous ovens likewise contribute substantially to the volume of gas used in modern convection equipment.

MANGANESE READILY LEACHED: Most western oxide manganese ores are readily leached by sulphur dioxide processes employed by the Bureau of Mines, it is learned in Washington. Manganese extraction ranged from 90 to 100 per cent among most of the tested ore samples taken from 58 deposits in 11 western states. According to the bureau, seven ores gave only moderately good extractions—80 to 90 per cent—and eight ores gave poor extractions—less than 80 per cent. Manganese in the readily leachable ores was present as one or more of the minerals, psilomelane, pyrolusite and wad. Most common impurities found were iron, phosphorus and zinc.

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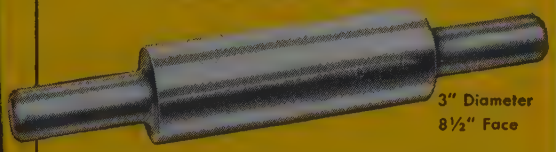

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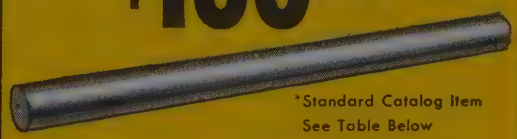

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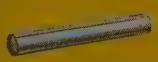

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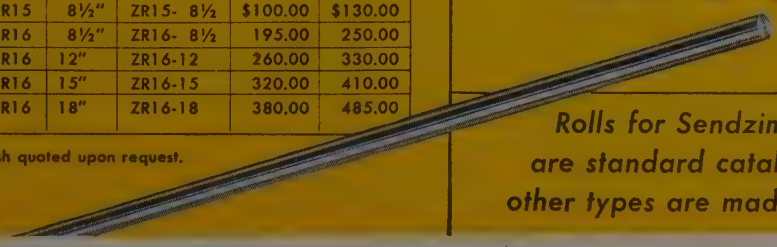

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.810	12⅜	13⅝	ZR16	12"	ZR16-12	260.00	330.00
.810	15½	16¾	ZR16	15"	ZR16-15	320.00	410.00
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*Rolls having special finish quoted upon request.

Rolls for Sendzimir Mills are standard catalog items; other types are made to order.

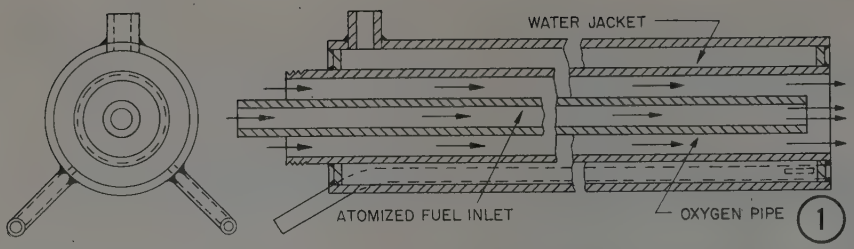


Fig. 1 — Typical burner for atomized fuels and oxygen

Oxygen-Accelerated Combustion in OPEN-HEARTH FURNACES

Introduction of oxygen at point of entry in furnace greatly increases efficiency of fuel oil ignition and provides new tool for controlling length of flame, its calorific output and travel within greater limits. Practice of lancing baths with oxygen has little effect on campaign life of the furnace

DUAL use of oxygen for acceleration of combustion and burning elements in the bath makes its application in the open hearth most interesting. According to S. T. W. Bailey, combustion engineer. Steel Co. of Canada, speaking before a recent Buffalo district section meeting, Association of Iron and Steel Engineers, the general feeling seems to prevail that given plenty of cheap oxygen, combustion engineers and open-hearth men are ready to co-operate to put it to effective use, wherever the mechanics of supply are adequate.

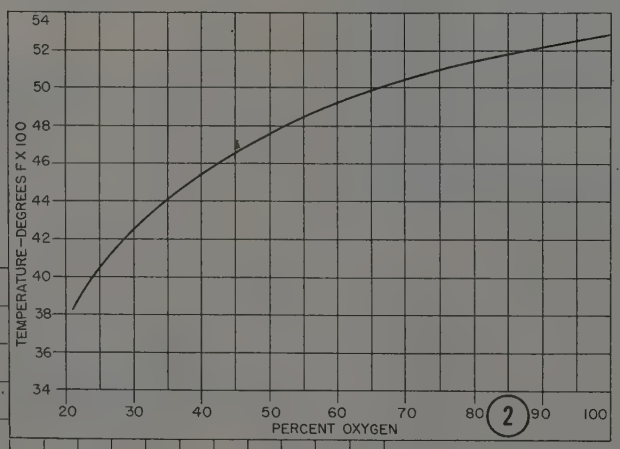
It seems evident that, in shops using a high ratio of hot metal in the charges, bath lancing may become the most important of the two uses. Most shops will be able to use oxygen for both purposes where facilities are such that materials can be moved to the proper place at the proper time. Other shops will require modernization of scrap and reagent storage preparation and charging facilities to meet the increased production.

According to information presented the Hamilton plant of the Canadian Liquid Air Co. Ltd., supplies the Hamilton Works of the Steel Co. of Canada Ltd., with 99.5 per cent oxygen at 160 psi by an interconnecting pipe line system. This oxygen normally is used for welding, cutting and scarfing operations. On learning that low cost oxygen could technically be furnished in large volume at around 95 per cent purity, it was decided to store a volume of the 99.5 per cent oxygen for use on weekends to conduct a few large scale experiments. To this end plans were made and a 180-ton open hearth furnace was selected, the oxygen volume requirement of which appeared to be within the capacity of the facilities available. Scheme of enriching the air by admitting oxygen into the checkers was abandoned at the start in favor of introducing the oxygen adjacent to the incoming fuel and thereby accelerate combustion. In general, the considerations discussed by Mr. Bailey which led to the adoption of the scheme were as follows:

Fuel Ignition: Heavy fuel oils are more difficult to burn at desired rates when the furnace temperature is appreciably below normal. This is true even though the correct amount of combustion air is supplied. It was reasoned that the introduction of oxygen adjacent to the atomized fuel oil as it entered the furnace would entirely overcome this handicap. Subsequent tests proved this supposition was correct and ignition was advanced beyond anything observed before, even when furnace temperatures were at their highest values. This feature is considered to be of paramount importance where short hot flames are required. Shown in Fig. 1 is the diagram of a typical burner for atomized fuels and oxygen.

Flame Development: Once having established early and active ignition the next consideration is flame development. Under normal conditions the ratio of port area used to admit air to that admitting oil is something in the order of 10,000:1. The atomized oil then has to contact a large volume of air and at the same time be expected to develop a high release of heat in as short a space as possible. It is really remarkable that results are as good as they are, when consideration is given to the physical handicaps imposed on the entering fuel oil and air which mitigate against their early and complete chemical union. Combustion tests show

Fig. 2 — Bunker C fuel oil. Relation of theoretical flame temperature to percentage of oxygen in enriched air



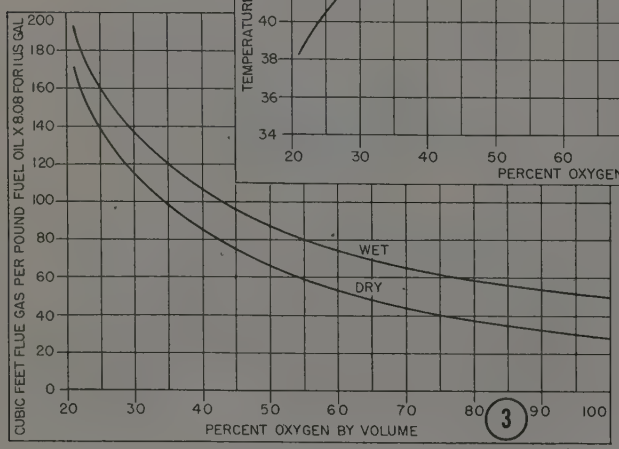


Fig. 3—Cubic feet of flue gas produced when burning bunker C fuel oil related to per cent oxygen by volume

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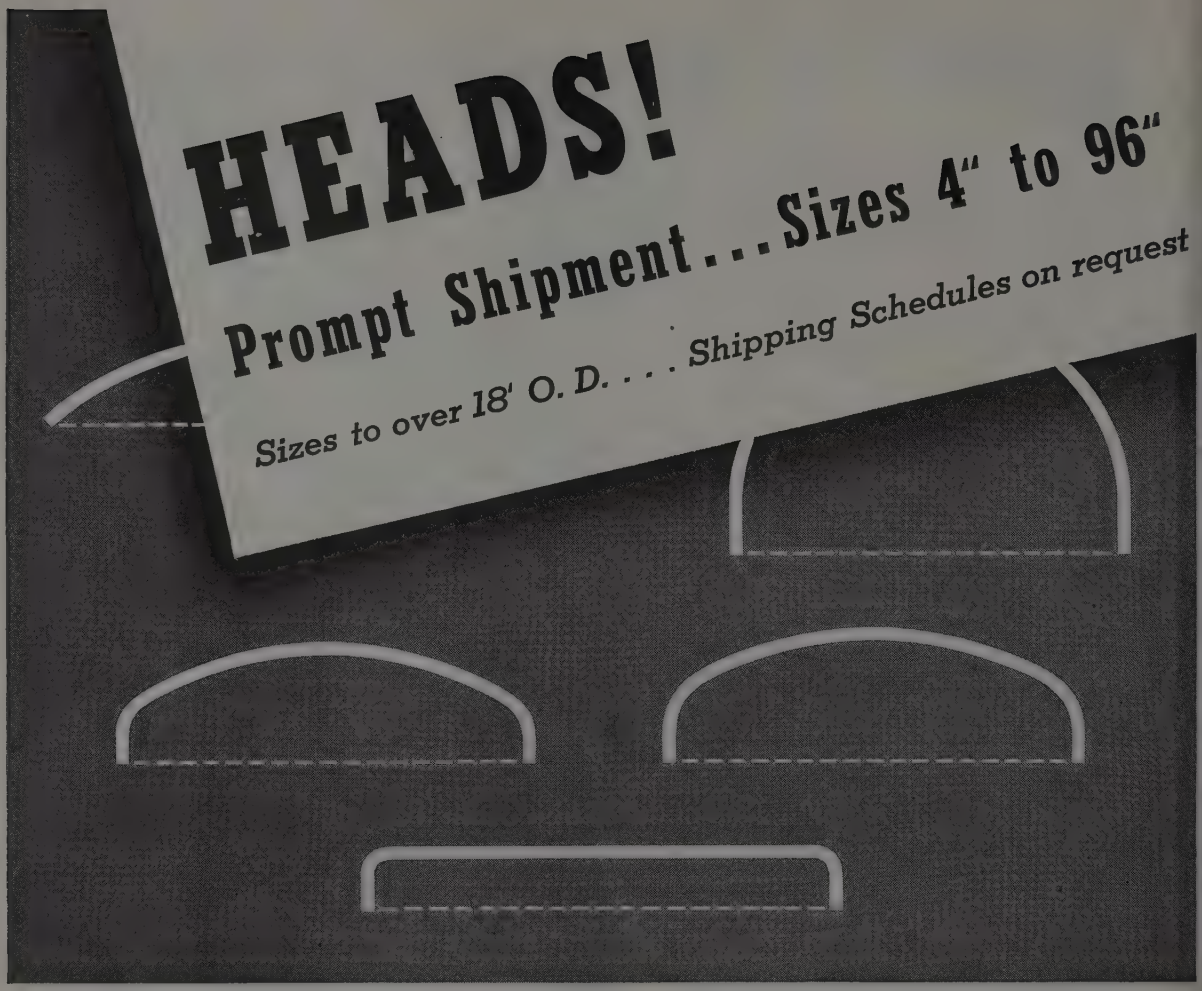

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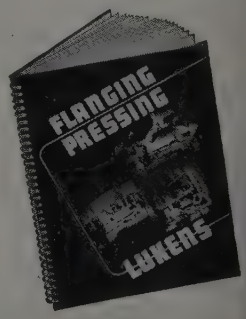

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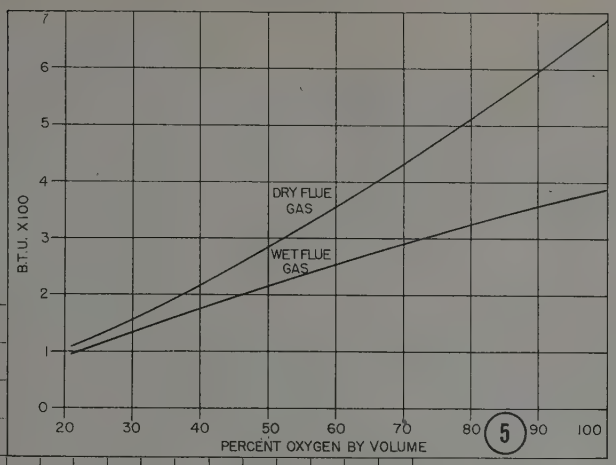

Fig. 4—Pounds flue gas produced when burning bunker C fuel oil related to per cent oxygen by volume

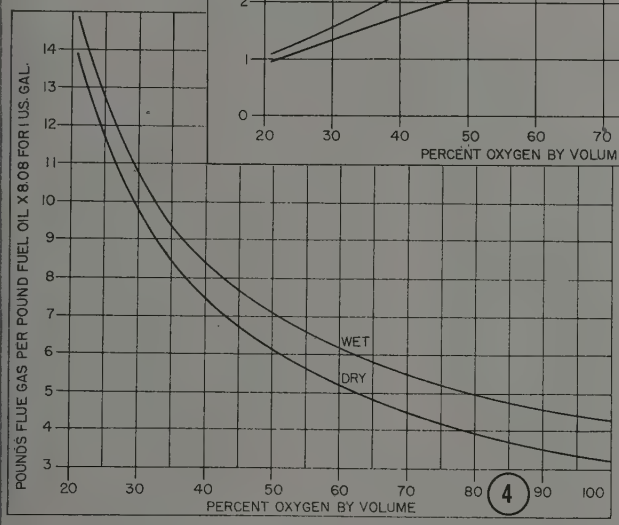

Fig. 5 — British thermal units released per cubic foot of flue gas from burning bunker C fuel oil related to per cent oxygen by volume

that not only could ignition be instantly and completely established but that combustion could be accelerated to an unusual degree. The degree of acceleration appears to be out of proportion to the small amount of oxygen admitted when compared to the total oxygen required for complete combustion.

It has been said that premixing and burning of fuel with air to get a maximum flame temperature and flame location in a furnace is the most desirable approach to fuel economy The introduction of oxygen along with the fuel at the point of entry can be compared to the discovery of a new tool whereby a means is now at hand for lengthening or shortening a flame, increasing or decreasing its calorific output and directing its travel all within limits much greater than those heretofore in general use. There appears to be no obstacle in the way of having the same burner provide highly luminous flames at such time as melting is complete and it is desired to increase radiation to the bath. The flexibility thus offered makes the hitherto limited open-hearth burner more universal in its application.

Rate of Fuel Input: The speaker mentioned that the open-hearth furnace is often criticized for having many features of poor design. But, when one considers, on the other hand, its triple function of heating, melting, and refining, it is, after all, a fairly good compromise. At least it works and has outstripped all competitors to date. The variation in temperature of the charge all the way from below zero scrap to molten steel approaching the 3000° figure is not encountered in many other processes. In such case it becomes desirable to increase the rate of heat input to a furnace especially after a portion of the scrap charge has been made. This, however, in the time when it is especially difficult to burn the desired amount of fuel. Cold furnace walls and scrap interfere with ignition and flame development. Scrap often mechanically deflects flames and has the effect of reducing the furnace volume. The net result is that less, not more, than the desired amount of fuel can be efficiently burned during this period of a heat.

When oxygen accelerated combustion is used many furnaces are enabled to completely burn fuel oil at a rate in excess of that normally employed. This augmented rate of calorific input cannot but help increase the rapidity with which the scrap heats and melts. Air temperatures remain slighty higher during the melting period and more uniform throughout the duration of the heat.

Refractories: Considerable concern has been exercised by a number of experimentors concerning the effect of oxygen accelerated combustion upon refractories. Although no definite conclusions can be drawn, a sufficient number of tests have been carried out in experiments at the Steel Co. of Canada to substantiate the claim that given reasonable supervision, especially toward the end of the meltdown period, no undue ill effects are discernible. In this work, it has been reasoned, that so long as there remained any substantial amount of unmelted scrap in the furnace there would be little danger to refractories from the hotter flames. The capacity of the unmelted scrap for absorbing heat is well beyond the rate of heat that could be released even at fuel rates 60 per cent above those normally employed. There is some evidence that brick costs per ton of ingots may be reduced. There is no reason to suspect that the campaign life of a furnace will be materially shorter than present. The practice of lancing baths with oxygen has proven to be a little hard on silica refractories.

Fig. 2 shows a curve relating to the theoretical flame temperature which result from burning fuel oil to the percentage of oxygen in the air. As can be noted the curve ascends rapidly for oxygen additions to air and flattens markedly as 100 per cent pure oxygen is approached. This characteristic helps to explain why small increases in oxygen supplied to a furnace can produce relatively larger increases in operating results.

Additional Equipment: Like many other steps that have been taken to improve the art of steelmaking, that of applying oxygen accelerated combustion appears

TABULATION OF TEST RESULTS

Item	Test Number 1	2	3	4	5
Total metallic charge, lb	396,065	396,430	415,165	389,085	399,470
Hot metal charge, per cent	41.4	41.9	43.5	37.8	41.6
Charging time, hr-min	2–23	2–45	2–22	1–47	3–55
Elapsed time to hot metal addition, hr-min	3–04	3–18	3–09	3–22	5–20
Total time required for heat, hr-min	9–10	8–10	9–05	7–22	11–10
Tons produced	183.60	179.10	188.95	163.30	174.95
Yield, per cent	92.7	90.4	91.0	84.0	87.6
Tons per hr (charge to tap)	17.91	21.90	20.72	22.07	15.67
Million Btu per nt	2,908	2,939	3,486	3,301	4,346
U. S. gal oil per nt	19.28	19.49	23.11	21.86	28.80
Nominal rate oxygen flow, cfm	600	700	800	1000	none
Experimental rate oil flow, U. S. gph	500	500	600	700	500
Normal rate oil flow, U. S. gph	370	370	370	500	370
Total oxygen used, million cu ft	124.9	155.7	165.5	190.8	none
Oxygen used, cu ft per nt	680	870	876	1,168	none
Corresponding per cent oxygen content of air for theoretical combustion	25.7	26.7	26.4	26.9	21.0
Cu ft oxygen per lb of cold charge	.538	.676	.706	.788	....
Rate of melting, lb of cold scrap per hr taken to time of hot metal addition	75,600	69,800	74,500	71,900	43,700
Slag analysis, actual FeO, per cent	....	9.8	6.0	9.0	11.5

Material Handling at First U. S. Tin Plant -built around BAKER TRUCKS

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Bagged ore, palletized at wharf, is loaded onto flat car by Baker Fork Truck. Another Baker Truck unloads and stores pallet-type crates at the plant.

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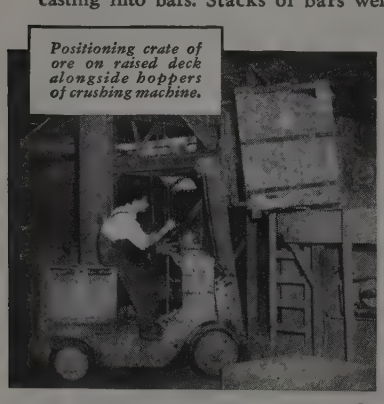
Ore arrives by vessel in 100 lb. bags, which are palletized at the wharf and loaded by a Baker Fork Truck onto flat cars, for transportation to the plant. Here another truck unloads and stores the pallet type crates.

As ore is needed, a fork truck carries a crate to the mixing hopper, placing it on a raised deck, from which bags are emptied into the hopper. After crushing and purification, ores go to the smelter for reduction to metal and casting into bars. Stacks of bars weighing 4,000 lbs. are carried by truck to storage and later to box cars for shipment.



Positioning crate of ore on raised deck alongside hoppers of crushing machine.

Besides Baker Fork Trucks, the plant uses a Baker Hopper Truck with built-in scale for measuring batches going to smelting furnaces.

Management and maintenance men are enthusiastic about the trucks—particularly because of their excellent service under the difficult operating conditions caused by the relatively fine and gritty nature of the ore handled.

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reasonably simple once it has been accomplished. Based on the work at the Steel Co. of Canada, about the only additional equipment required at each oil-fired furnace is the following:

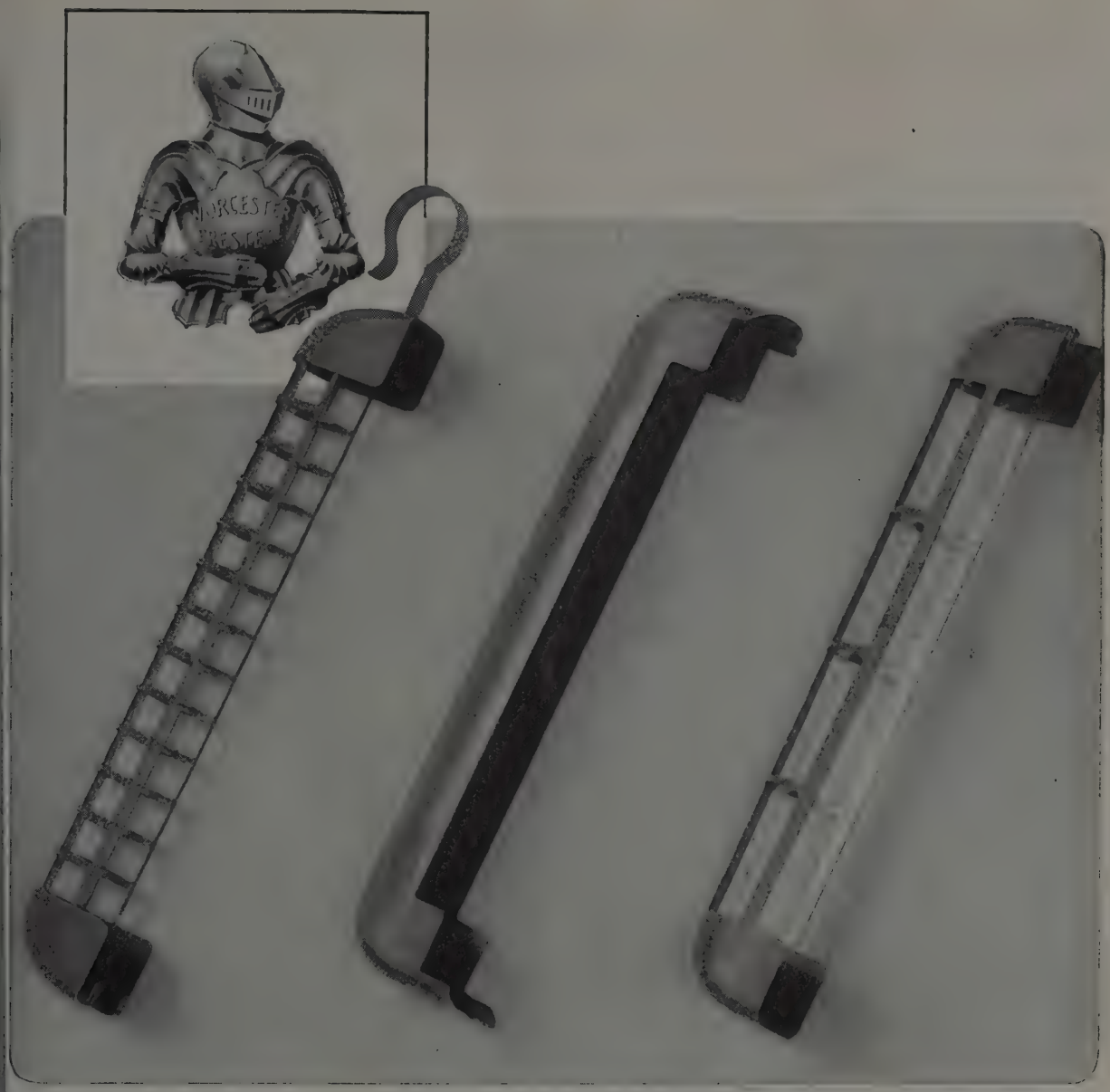
1. A rate of flow valve preferably remotely controlled.
2. A recording integrating flow meter.
3. Two reversing valves that will function on the same time cycle as the steam reversing valves.
4. Two burners having an annular space around the atomized oil burner pipes.
5. Means to check spent gases leaving the furnace so that their oxygen content can be maintained at a normal figure by readjustment of the air volume delivered from the checkers.

Shown in Figs. 3 and 4 is the volume and weight respectively of flue gas produced when measured on both wet and dry basis and when burning 1 lb of bunker C fuel oil using air containing varying percentages of oxygen. The steep slope of these curves toward the 20 per cent oxygen side of the chart is of interest. Fig. 5 shows that an almost uniform rate of increase in the Btu released per cubic foot of flue gas results from the combustion of bunker C oil using air containing various percentages of oxygen by volume.

Furnace Test Results: The first tests of any importance in the Canadian plant were carried out on March 10, 1946, and consisted of admitting a flow of approximately 600 cfm of oxygen, 3 in. above the atomized fuel oil as it entered the furnace. This test resulted in three important observations: Rapid ignition, the ability of the furnace to burn higher rates of fuel and speedier melting of the scrap charge. Tabulation of results are given in the accompanying table. As can be noted in the tabulation of the test results, heats Nos. 1 to 3 were much alike except for difference in oxygen flows. Test No. 5 which is used as a standard for the comparison was produced by making available at the furnace all materials when required. The operators were asked to do everything they could to reduce the time required to make a heat with the facilities at their disposal.

The average production rate expressed in net tons per hour for heats Nos. 1 to 4 was 31 per cent greater than heat No. 5. The average fuel requirement expressed in thousands of Btu per net ton for heats Nos. 1 to 4 was 27 per cent less than heat No. 5. It was pointed out that this reduction is greater than normally would be expected as the fuel required to make No. 5 was excessive due to a tendency to crowd the furnace.

Heat No. 4 was produced in a furnace having a suspended roof as well as ends composed of basic brick. The input of approximately 700 gph of oil probably represents a record for a furnace tapping around 180 net tons, and having a



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This one-piece light shield for a fluorescent extension light was formerly made in three pieces using perforated strip (left above) with ends attached. This construction required assembly by spot welding and the design was such that too much light was obstructed.

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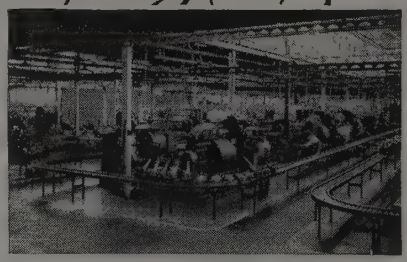

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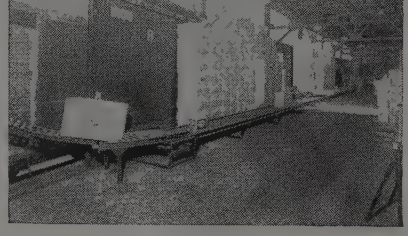

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bath area of 535 sq ft. In order to further assist the rapid merger of atomized oil and oxygen in a mechanical way and also to broaden the resulting flame, a helecoidal insert was placed in the burner pipe 6 in. from the exit end. This insert consisted of a double twist auger having a diameter and pitch of 1 1/16-in. and having a length to give two complete turns.

This device imparted vigorous whirling action to the atomized oil-steam mixture which emerged into the furnace as a spinning core of the incoming oxygen stream. The oxygen was being injected at a rate of 1000 cfm, and the resulting flame was intense, blue-white, and it was dimensionally greater than a normal flame.

Bath was lanced with oxygen to reduce carbon with the object of combining the two uses of oxygen in an effort to have a test indication of the total heat time required. Indications are that given reasonably good conditions, a heat of steel can be made in close to seven hours using a 60:40 scrap to hot metal charge ratio, oxygen accelerated combustion, and bath lancing. However, it was pointed out that the average times from charge to tap will probably be at least 1 hour longer.

Reduction in melting time by at least 2½ hours is an important result. It was indicated that melting time may be further shortened when conditions include a plentiful supply of low cost oxygen thus permitting trials to determine the best combination of oil, air, and oxygen flows as well as the best burner arrangement.

A sufficient number of tests have already been conducted to indicate the approximate gain that can be credited to oxygen accelerated combustion. In the future, given the correct flows of oxygen, oil, and air in a properly designed and installed burner, the gain due to oxygen acceleration, which is derived almost instantly and independently at the burner tip, can be realized using plant furnace operators in the regular scheme of operation.

GE Built Dredge Equipment

Electrical equipment for the tin dredges for the Dutch East Indies described in STEEL, July 28, p. 90, was made by General Electric Co., Schenectady, N. Y. Power for the generators is supplied by three 875-horsepower Cooper-Bessemer diesel engines. Generators are 3 phase, 50 cycle, 400 volts, and rated at 600 kilowats. Winches for maneuvering the dredges are operated by direct-current motors with Ward-Leonard variable voltage controls. The dredges were built by Bucyrus-Erie Co., South Milwaukee, Wis.

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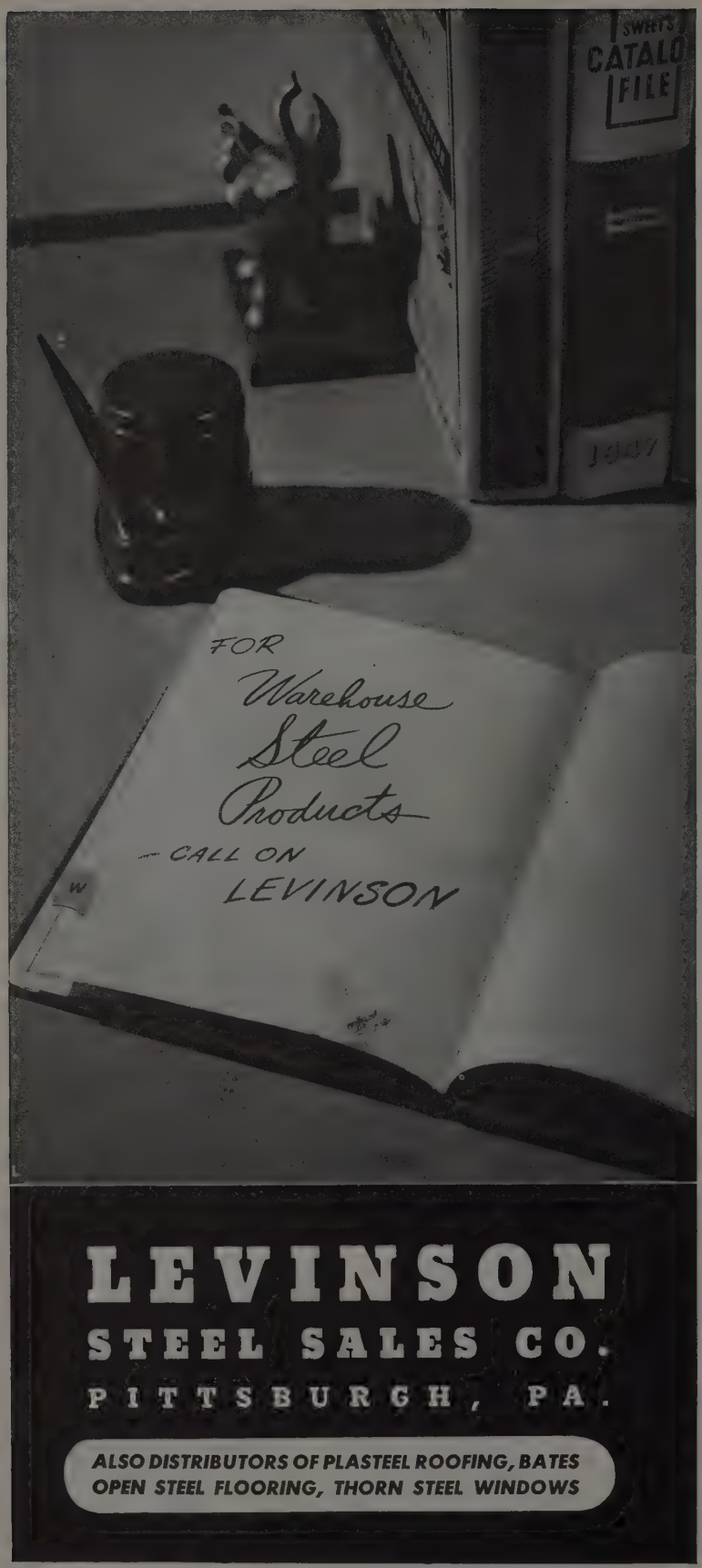


Gas Fluxing

(*Continued from Page* 88)

nonmetallic material (to prevent iron or other alloy pickup), coated with a refractory, through which the gas is finely dispersed. Discharge tips or heads are made of a special nonmetallic material to prevent iron pickup and to extend service life.

Safety Measures: Chlorine gas can be toxic if inhaled in quantity. It also can cause serious internal corrosion in pipe lines if moisture is allowed to enter. However, this gas has caused no serious trouble. Safety measures built into the system include an expansion tank mounted inside at the highest point on the unloading line. This tank is an empty 100-lb cylinder for liquid chlorine, mounted vertically, upside down, and is of sufficient volume to absorb any expansion in the system. Another safety measure is the frangible diaphragm in the top of the evaporator, designed to rupture at 225 psi. The discharge side of this safety head is connected to a vent to carry away the gas to a safe point if the disk blows out.

In order to prevent spread of any escaping gas over a wide area in the plant in event the rupture disk leaks or breaks, the vent should open into the air not above the top of a building but along the ground at a low point. Since chlorine gas is heavier than air, gas would simply be poured on the building if an overhead vent were to go into operation. It is therefore desirable to have any discharge collect in a low area and not spread. The rule is to run all vent outlets to a low point on the ground, and to inspect the open end of the vent frequently to check the tightness of the diaphragm.

It is important to insulate the gas line properly, or condensation will liquefy the chlorine and form slugs or blobs that may enter the bath. Furthermore, liquid chlorine rapidly attacks rubber hose connections. Placing pipe lines high and away from mechanical damage is also an absolute essential. Sufficient valves should be employed to permit the isolation of any furnace or section without shutting down the entire system. Gas masks are kept handy for use in repairing leaks.

When working on lines that have been used to carry chlorine gas, it is wise to cork up all openings in the system to prevent formation of hydrochloric acid by reaction with moisture in the air. It also must be kept in mind that chlorine will not attack iron or steel pipe if it is kept dry, and at temperatures below 180° F. (Higher temperatures result in rapid attack.)

What would happen if some gas condensed in the lines and liquid chlorine entered the bath of molten aluminum

—an explosion? No. This proved to be a needless worry because even then the chlorine is vaporized in passing through the feed tubes and simply produces a few extra large bubbles of gas as it escapes up through the bath.

To clarify the process innovations developed and used by Reynolds to produce economically high quality metal from mixed scrap on a commercial basis, the main factors are summarized here: Instead of cutting up scrap into small sections by hand, Reynolds does no cutting; charges complete aircraft wing and fuselage section (up to 9 ft wide) where these are encountered.

Instead of segregating and separating out lead, copper, iron, brass, etc., by hand, nothing is segregated; melting and refining practice take care of all tramp metals and all impurites. Instead of charging furnaces by hand, all furnaces are charged mechanically in large batches.

Instead of batch charging, melting, refining, pouring, the furnaces are charged as fast and as often as possible, aiming for a continuous melting operation. Furnaces are tapped at regular intervals as fast as holding hearth fills.

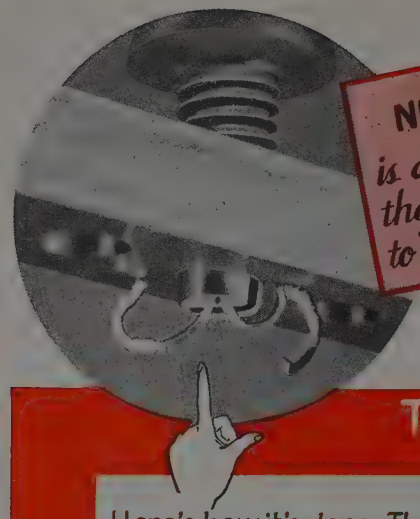
Instead of losing considerable metal by "burning" and producing considerable dross and skim, practically 99 per cent of the aluminum content is recovered. No aluminum is lost by "burning", even in thinnest sheet form. Instead of charging granular fluxing materials (such as aluminum chloride) under the bath surface at intervals by hand, Reynolds fluxes and refines continuously by discharging gaseous chlorine into the bath continuously. This eliminates another manual operation.

End result is that the reclamation of high grade secondary aluminum metal from difficult-to-process widely mixed scrap (such as wrecked aircraft) is placed on a sound commercial basis for the first time, opening up another source of good aluminum to the metalworking industry.

Oil Reclamation

(*Continued from Page* 84)

allowing impurities to settle. As more oil enters the sediment tank the older oil overflows into a pipe line which leads to the "hot" chamber of a 6000-gal tank in which the "hot" and "cool" chambers are separated by a weir. Since the oil has just returned from a quenching bath, it contains considerable heat. To cool it, it is pumped through the cooling tower. The latter has a 240 gpm oil circulation capacity. Its 4-inch heat exchanger, divided into two circuits with an effective surface area of 550 sq ft, is capable of dissipating 373,000 Btu per hour. With this tower capacity, oil temperature of 14,400 gal can be



NEW "TAP" SCREW
is actually a cutting tool that removes material to TAP its own threads!

ELIMINATE TAPPING COSTS

Here's how it's done. The slot, corresponding to flutes of a tap, provides two balanced cutting edges and a chip reservoir. *In photo, note chips cut and pushed ahead.*

HOLTITE "TAP" SCREWS

U.S. Patent No. 2,292,195 Other patents pending.

Do not confuse this remarkable new screw with the ordinary self-tapping screws that forcibly displace the material by a cold forging action.

Fundamentally a narrow fluted two-flute tap, this new "TAP" screw actually removes the material when *cutting* its own perfect mating threads to effect tighter, stronger fastenings that resist vibration.

Fine or curled metal chips, and tough, gummy non-metallic cuttings free themselves readily in the open slot reservoir to prevent binding. The two balanced cutting edges of slot cut threads much deeper than their own diameter.

Eliminate tapping operations by using HOLTITE "TAP" screws in metal, castings, alloy, rubber, plastics, etc. You'll get stronger fastenings at less cost!

CONTINENTAL SCREW CO. New Bedford Mass. U.S.A.

lowered from 15 to 20° F per hour. After the cooling operation, the system may be set either to let the oil run into th "cool" chamber, or to allow it to go directly to the furnace tanks. Usually it is returned to the cool chamber. In either case, the lubricant has completed its cycle.

Mineral seal oil is used to flush out bearings after final assembly. Like the cutting and quenching oil, it is delivered by tank car and is unloaded into a 12,000 gal storage tank by gravity pipe line. A 5 gpm pump is used to pump it out of the storage tank into a 600-gal mineral seal unfiltered oil tank. The latter is filled to a minimum of 2500 gal. Five 7.5 hp motors are used to drive pumps which force the oil from the unfiltered tank through a bank of 20 oil filters. After being filtered it flows into a 3000 gal filtered mineral seal oil tank. From there it is pumped to the six bearing washers under a constant pressure.

A gate valve at each washer controls the oil pressure as it is delivered to a head. Each bearing as it is placed in the head, is clamped into position by the outer race. The head is rotated approximately 45 degrees and the oil, under pressure, is allowed to flow out of slots set on an angle. At this point, the oil assumes a swirling motion as it is guided through raceway of the bearing, to wash the bearing thoroughly. The used oil then falls to the floor of the washer and drains into a return gravity pipe line to the unfiltered 6000 gal tank. The oil cycle then repeats itself. This method is so efficient that only 15,000 gal of new mineral seal oil are needed to replace wasted oil each year.

System of insuring delivery of clean soluble oil coolant to each grinder is of special importance. In no case is coolant re-used in grinding machines without first being returned from the machines to two large tanks in the reclamation section where all solids picked up in grinding operations are removed. In each tank there are four sets of spring filters through which reclaimed coolant is drawn. These are kept clean by an electrically-timed automatic back-wash which rids the springs of collected sediment at regular intervals.

Two 500 gpm centrifugal pumps are used to deliver coolant under pressure to each grinder from the two settling and filtering tanks. Reduction valves positioned at each of the grinders serve to

Copperheading

References to "copper beading" in "Preparing Steel for Porcelain Enameling," STEEL, July 21, p. 102 and 115 should read "copperheading."

SYNCHRO-TROL ... packaged controls for RESISTANCE WELDING

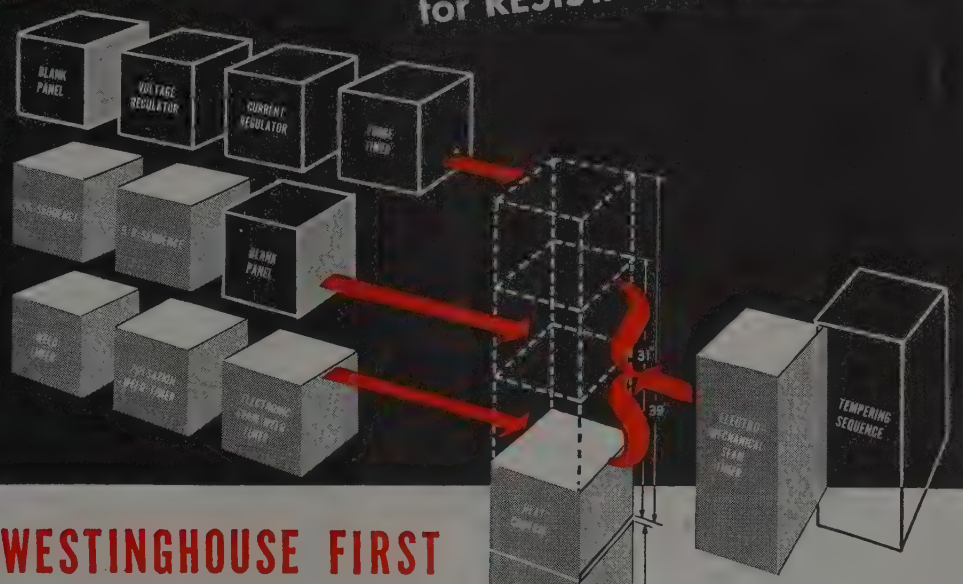


Chart indicates the various subunits you can choose from and how they go together to form a centralized control unit. Few connections required. Basic timing and sequence functions isolated for quick change-over.

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to simplify welding operations

Now you can have packaged resistance welding controls ... selected to meet your specific requirements ... factory-tested and factory-assembled as a compact, packaged unit.

The Synchro-Trol simplifies your resistance welding control problems. Buying is simplified ... you select only the units you need. Installation is simplified ... multiple connections, awkward sizes and complicated mountings are eliminated. Savings of 50% or more in floor space are possible. Operation is simplified ... the Synchro-Trol brings together all controls in one cabinet—permits swift, accurate settings for the job and protects the controls against tampering.

You can choose from eight basic subunits to build up your Synchro-Trol ... Electronic Contactor, Heat Control, Weld Timer, Electronic Seam Timer, Electro-mechanical Seam Timer, Pulsation Weld Timer and NEMA 7B and 9B Timers. A choice of five other subunits adds even greater versatility for your welding operations. A blank panel is also available to house any small controls required by your special process or to permit changes in your installation that may be desired later.

Find out today how this new packaged control by Westinghouse can simplify your resistance welding operations. Write your nearest Westinghouse office, or Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y. J-21395

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Every user of Udylite equipment and supplies knows that there is an experienced Udylite plating engineer always ready to help him correct plating difficulties and improve practice. Udylite has the know-how of plating experience with every type of installation.

Udylite also maintains a pilot plating plant in which a user's particular problem is solved without interfering with his regular production schedules.

These services, in combination with Udylite's ample stocks of platers' supplies, provide *plus* values which only an organization like Udylite can furnish

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cut this pressure to individual machine requirements.

After its use in the grinding machines the coolant drains directly into trenches in the floor—one of which is employed for each battery of grinders. From each machine a separate discharge line is run to the nearest recovery trench. The lines are designed without sharp bends to avoid the settling of sludge. Two pumps are located in a sump in each trench. These are controlled by an electric float switch, so that one pump is cut in when the coolant level begins to rise, and the second pump begins operation when more coolant than one pump can handle accumulates.

At all times, approximately 40,000 gal of grinding coolant are carried in the system, with approximately 400 gal of water and 8 gal of oil added daily for replenishment. In all ninety-two grinders, as well as six milling machines, are served by the setup.

System serves to keep the machines remarkably clean, whereas under the customary arrangement the necessity of cleaning machine sumps was a pressing and costly problem. Also, the clean fluid aids greatly in obtaining a high quality of finish-ground surfaces.

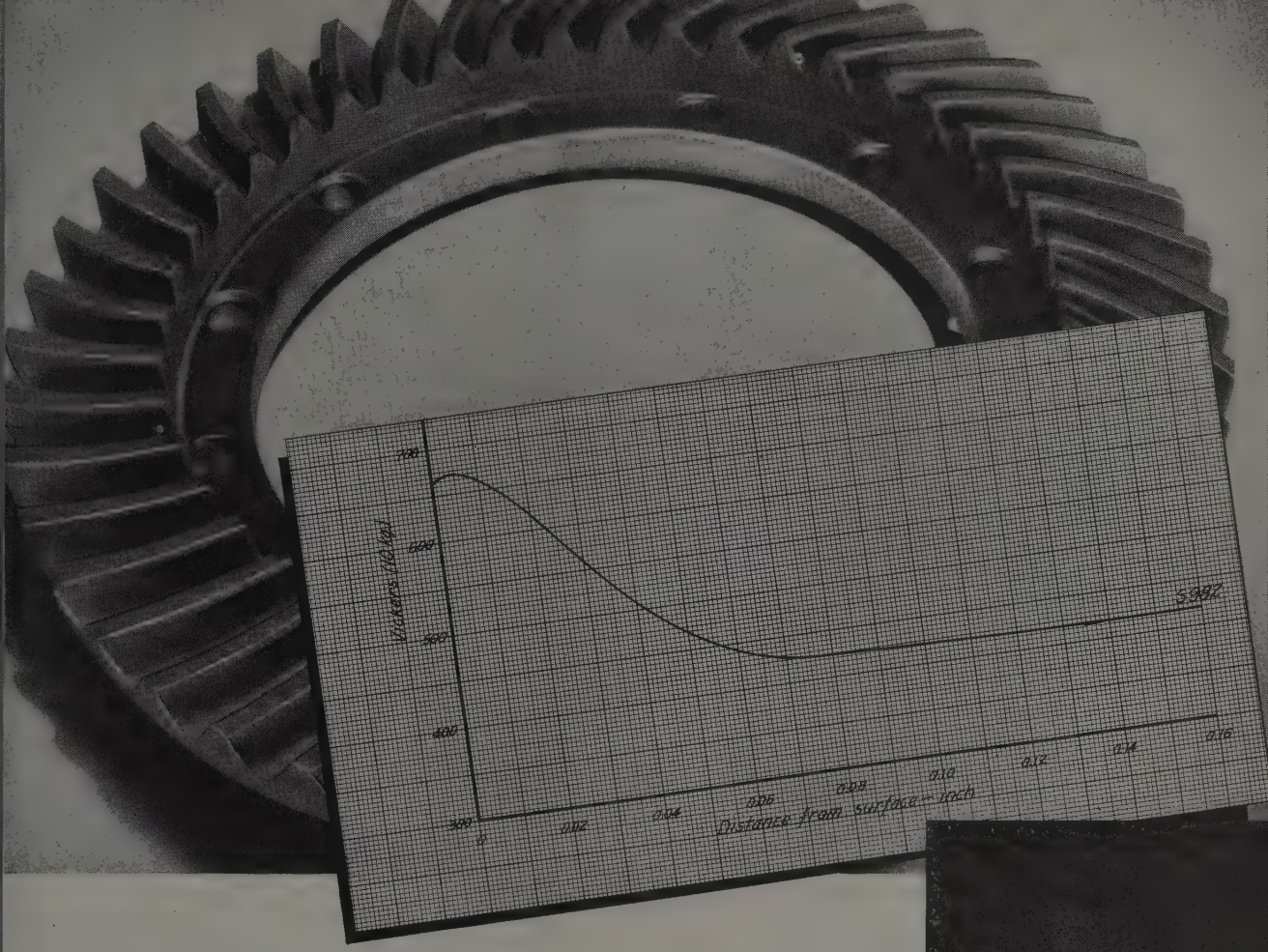
Spring Materials

(*Continued from Page 79*)

medium, most often another lead pot like the first. It is obvious that temperatures in use depend upon the wire speed and that this speed must be so adjusted that the wire is well over the critical range when quenched, and yet slow enough to be drawn to the correct tensile and hardness values. In leaving the quenching oil, the wire is hot and must be so to avoid the possibility of cracking.

Valve spring wire is the highest quality oil tempered carbon steel wire. It is used on most internal combustion engine valve gearing. The specification which best covers this is ASTM A230-41, or the chemical composition is SAE 1065 to 1070. Valve spring wire is thus chemically similar to ordinary oil tempered wire and its heat resistance is identical. Thereafter all similarity ceases. This, the best of the oil tempered carbon steels, is produced by slow rolling of the hot rod to the desired size; then this rod is double lead patented, that is, heated continuously to the annealing temperature in one lead bath and quenched in another lead bath between 900° and 1200° F. After cleaning, baking, etc., it is reduced in diameter 70 per cent maximum and heat treated in the continuous process.

Every precaution is taken not to scratch the surface, to prevent decarburization and to obtain uniform solution of carbides in the heating cycle. It is



BETTER GEARS, CAMS, SPLINES...FROM

AISI A 6120 CHROMIUM-VANADIUM STEEL

Of particular significance is the curve shown in the accompanying graph, for it represents the gradual decrease in hardness penetration that is one of the notable characteristics of A 6120 Chromium-Vanadium carburized steel.

An example of the excellent light case—free of embrittling carbides—imparted to this steel by a simple direct quench and temper treatment is clearly presented in the photomicrograph.

Unusually strong, hard and wear-resistant, this case and the inherently tough and ductile core are bonded to an exceptional degree by the uniform decrease in carbon penetration from case to core. In service, these superior properties assure longer life and more dependable performance.

Our metallurgists will be glad to work with you in the application of Chromium-Vanadium carburizing steels.

Photomicrograph (100x) and hardness penetration graph of Chromium-Vanadium A 6120 steel, with a light case (0.80–0.85% carbon) in outer .010 inch.

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It's the brand of service that Wolff puts behind every order, a more-than-skin-deep effort that sincerely tries to help you get what you need when you need it. You'll probably agree that this belief in the importance of the customer's interest is what differentiates a functioning warehouse from a stock-book storehouse.

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because of surface conditions and heat treat uniformity that valve spring wire gives high endurance limits consistently throughout industry. This is the wire to use in all important places, since its fatigue limits in compression springs, shown in Fig. 2, are well known.

During the war, music wire was built to Army, Navy, and Air Corps specifications, which were basically copies of ASTM A228-41. This material is the highest quality cold drawn wire made and is drawn wet the last few passes. Wire is patented and drawn dry, repatented and drawn dry, until the right size material to make the finished product is at hand. This wire is drawn through dies under or through a liquid which contains tin salts. This results in a slight tin deposit on the wire which lubricates its passage through the dies. Music wire is reduced about 80 per cent in cross sectional area by cold work in eight to ten passes. The resultant product is very smooth, has a high tensile strength, and after forming into springs, if heated to 375° to 425° F, will actually increase in hardness and tensile strength. If heated 700° to 725° F, the physical values drop slightly, but the resistance to heat increases and the fatigue range is helped and made more uniform.

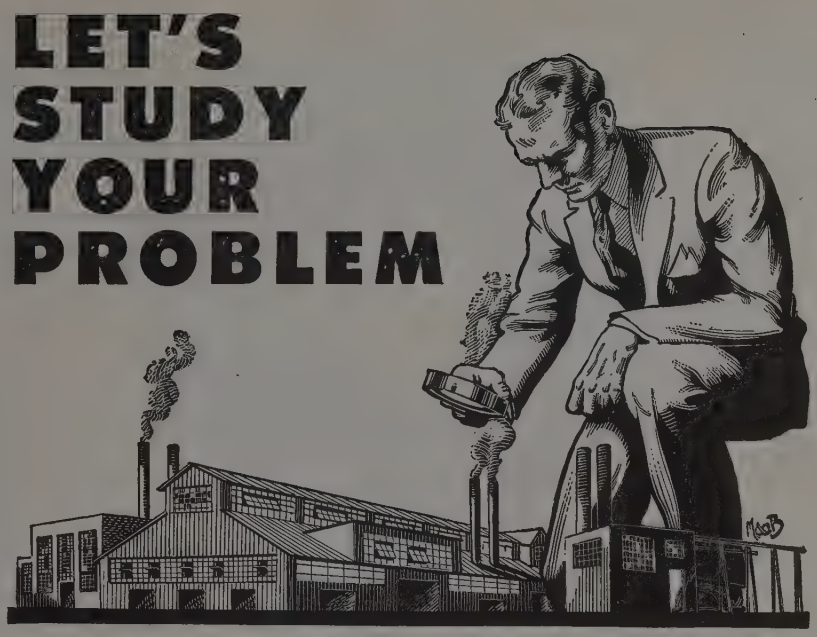
Alloy Steel Wires: One of the most common alloy steels used in springs corresponds to SAE 6150, called chrome vanadium by the spring industry. This material can be obtained oil tempered or annealed in valve spring quality or at higher hardness used in guns for some recoil springs. All previous remarks regarding the preference for use of pretempered steel where possible are here in order, and even more so since the higher hardenability of this steel insures a greater percentage of hardening cracks.

For springs of high endurance, this material is usually purchased 43 to 47 C rockwell, while for extreme stresses where a short life can be anticipated, rockwell is increased to 50 to 53 C. The material in sizes under consideration, 3/8-in. or less, has no higher endurance limit than regular carbon steel of valve spring quality. It does, however, produce springs that settle less under temperature up to 425° F, than carbon steel.

The war brought to the front in the mechanical spring industry a new steel, which, for want of a better name, was called chrome silicon. There being no specification number for this steel, its analysis is given as follows:

Carbon	0.50—0.60	per cent
Manganese	0.60—0.80	
Phosphorous	0.04	Max.
Sulphur	0.04	Max.
Chromium	0.50—0.80	
Silicon	1.30—1.60	

Obtained in the pretemperd state at a



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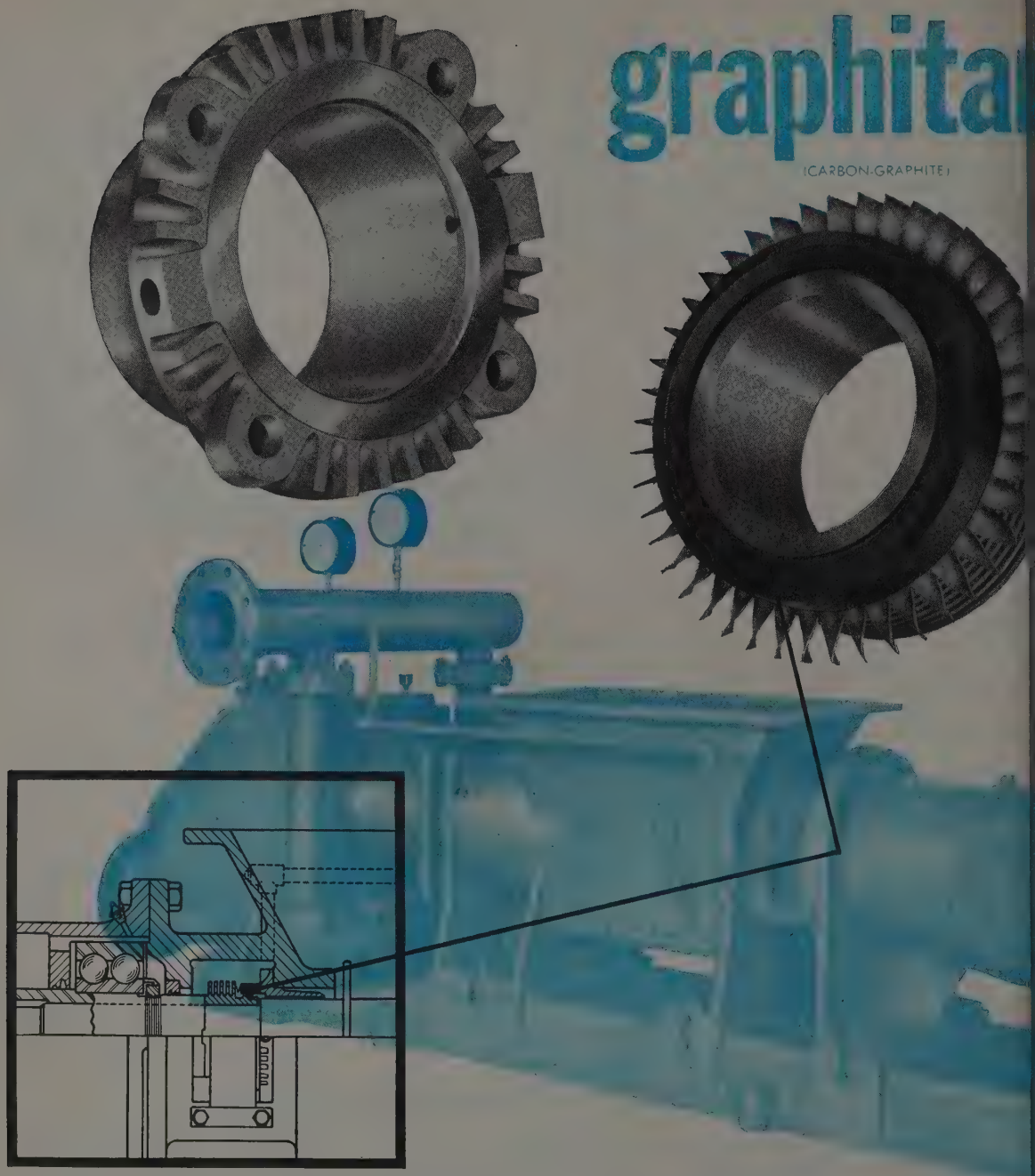

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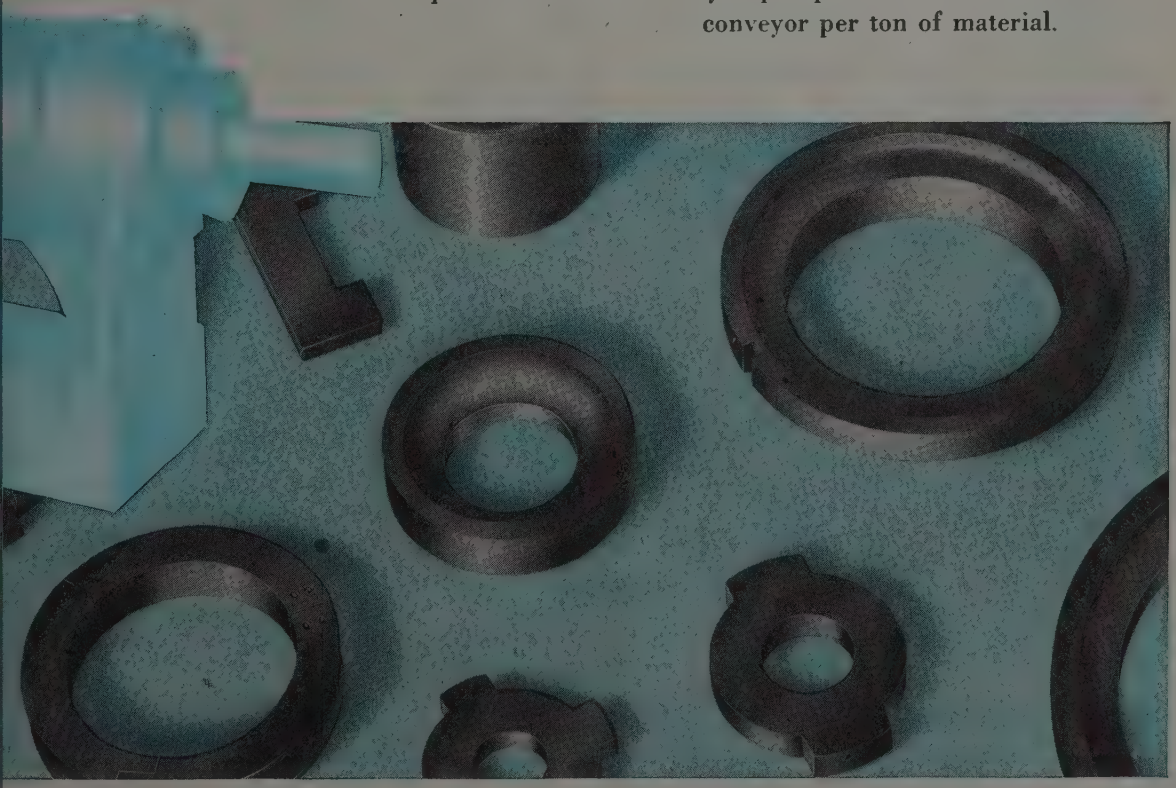
GRAPHITAR parts are bringing trouble-free operation at low cost to many types of mechanisms throughout industry. *Molded of carbon and graphite* and finished to close tolerances, GRAPHITAR seals, rings, pistons, cylinder liners, and other parts operate satisfactorily without lubricant—they are mechanically strong—chemically inert—unaffected by temperature extremes—and they are exceptionally lightweight. We are equipped to mold GRAPHITAR to any practical shape and to finish it to tolerances as close as .0005″ in small sizes. Our engineers will be glad to study sketches of your products and show you where GRAPHITAR parts will improve mechanical performance at lower cost. *Ask for 44-page catalog.*

THE UNITED STATES GRAPHIT

eal keeps out gritty naterials from pump bearings

Fuller-Kinyon Type H Stationary Pump employs Graphitar Seal Ring to protect Ball Bearings against cement and other gritty materials in hopper

Cement, pulverized limestone, phosphate, feldspar, and other pulverized products handled so efficiently by the Fuller-Kinyon Type H Stationary Pump *can't work into the shaft bearings and cause abrasive destruction.* WHY? Because the material in the hopper is sealed from the bearings when pump is in operation and under pressure by means of a GRAPHITAR seal ring (see Illustration). In cement plants, the cement pump may be used under the silo where the head above the hopper may be from 70 to 80 feet. Under these conditions, it will be appreciated that the seal is *subject to considerable pressure.* Air piped from the header aids in keeping the ring clean. The GRAPHITAR seal offers excellent resistance to wear arising from shaft rotation. it requires no lubrication, and it *seals dependably day after day* to help make this Fuller-Kinyon pump a most economical conveyor per ton of material.



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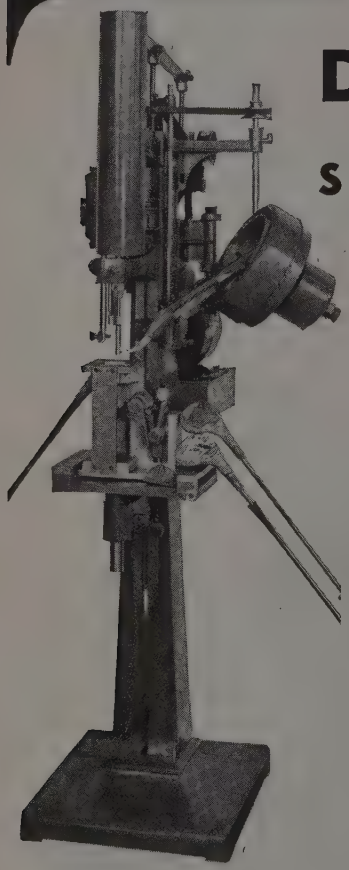

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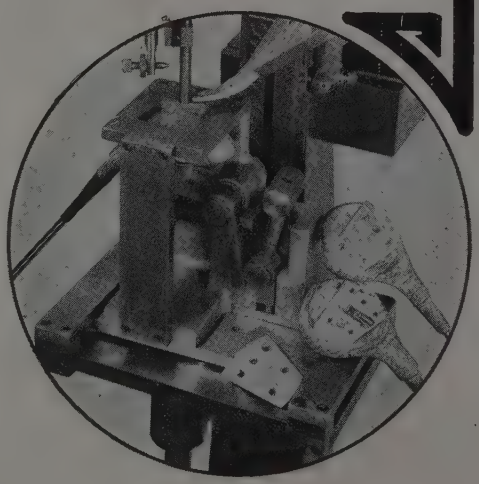

DETROIT POWER SCREWDRIVER CO.

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DETROIT 16, MICH.

rockwell of 50 to 54 C, the material gave tensile values of 325,000 psi with a 50 per cent reduction of area in size 0.035-in., decreasing to 265,000 psi with a 42 per cent reduction of area in ⅜-in. wire.

Endurance limit, after or before shot blasting, equals carbon steel in the same condition, and it will withstand equal stresses at better than 100° F higher temperature than chrome vanadium steel.

Silico manganese steel, SAE 9260, was also greatly developed in the smaller wire sizes during the war. With 50 to 54 C hardness, a tensile value of 300,000 psi, with a 50 per cent reduction of area in size 0.035-in., can be obtained. As the size increases to ⅜-in., the tensile will drop to 250,000 psi, with a 42 per cent reduction in area. Steel can be interchanged with chrome silicon, giving practically the same results if all conditions are equal.

When springs must withstand elevated temperatures, to date the best results are obtained with steels having the highest carbide concentration. Thus, 18-4-1 tungsten high speed steel or the 6-6-2 molybdenum type are equally good. At a total combined stress of 40,000 psi, 700° F is handled, and, by cutting this stress in two, springs handling 800° F have been produced successfully. In any event, the use of a double draw to insure relief of any martensitic precipitate is essential. Usually one of 1050° F and cooling to room tempeature followed by one at 1150° F will give best results. Typical results are given in Fig. 5.

Stainless steels have been used with varying success and several analyses have been tried out. To date, the best steel is SAE 30915, or Type 302. This material can be drawn from 0.003-in. up to sizes of 5/16-in. with good results. Larger wire for mechanical springs has not been demanded in any volume. Tensile strength varies from a minimum of 350,000 psi for the small size to 160,000 psi for the 5/16-in. This material, when not grounded or in electrical contact with copper alloys in the presence of halides, is very resistant to corrosion. Its stress range is about 20 per cent less than valve spring wire for sizes of 5/32-in. or less, and 1/3 less as sizes increase to 5/16-in.

One stainless steel analysis, 16-2, has the same modulus as steel. Its use has been somewhat limited because the price differential is not very great and, with 18-8 available, pressure for its development is light. The addition of molybdenum in amounts of 2 to 3 per cent to 18-8, or the use of type 316, has been successfully accomplished. Moly-stainless was much used by the Navy during the war because corrosion resistance was greatly improved in salt water and elec-

3 Main Reasons Why—

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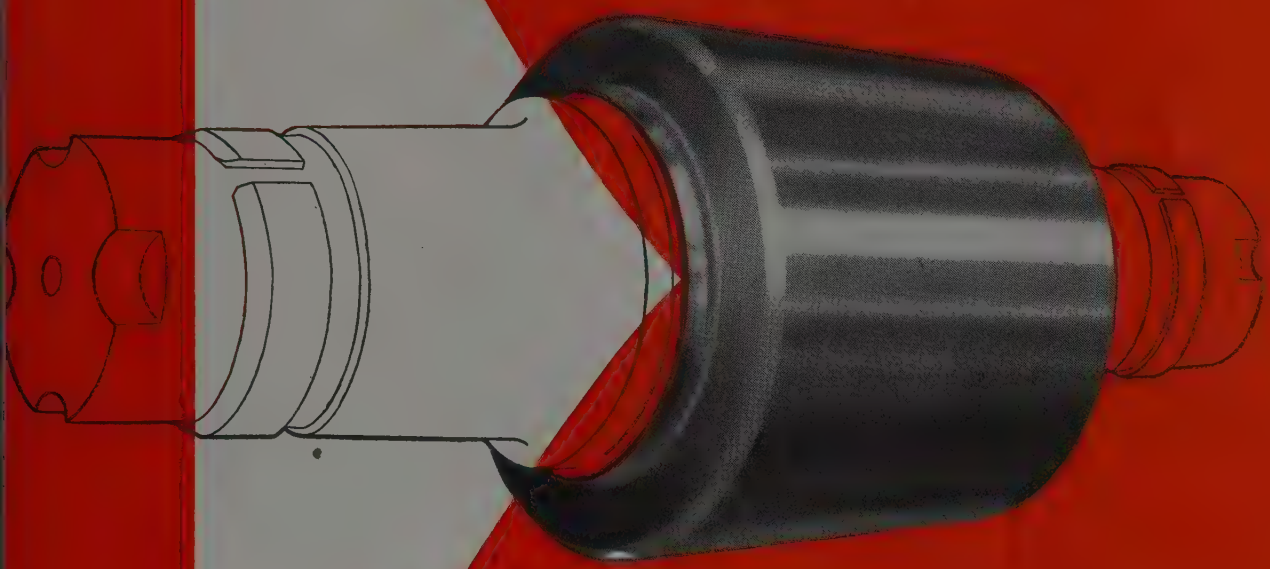

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If you are interested in greater tonnage at lower cost, investigate the advantages of Heppenstall sleeves. And remember, too, that Heppenstall produces forged arbors—also "tailor-made" as to both material and strength for extra service. Write Heppenstall Company, Pittsburgh 1, Pa.

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trolytic action reduced. This addition causes stainless steel to harden much faster by any cold working processes, so that tensile strength cannot be as high as 18-8, if bad bends or small ratios of wire size to spring diameters are encountered. Slightly lower stresses are advisable with this alloy because of these conditions.

Heat treatable stainless steel of the 18-8 type has just been announced by Carnegie-Illinois Steel Corp. At present it is called stainless W. The analysis is as follows:

Carbon	.12	Max.
Manganese	2.00	Max.
Phosphorous	.04	Max.
Sulphur	.04	Max.
Nickel	6.00 — 8 00	
Chromium	16.00—18 00	
Titanium	1.00	Max.
Aluminum	1.00	Max.

The material is furnished in its annealed condition (cooled from 1850° to 1950°F) and is capable of developing the mechanical properties as outlined in the accompanying table.

Copper Alloys: Of all the common copper alloys used in the production of springs, phosphor bronze is one of the most useful. Brass also used to play a part, as witness many of the old-fashioned clocks and lock mechanisms where these springs are still functioning. A newer alloy of the last ten years is beryllium copper. This alloy has many excellent properties, but is more expensive than the others. The silicon bronzes are similar to phosphor bronze in many respects and are somewhat cheaper due to the use of silicon instead of tin. All of these metals can be obtained in flat or wire form. The analysis is the same for either form into which the material is processed.

Mechanical spring makers use two grades of phosphor bronze designated as grade A and grade C. These are outlined in ASTM B103-44 for flats, and B159-44T for wire. Grade A is about 4½ per cent tin and grade C, 8 per cent. Best physical properties are with the greater tin content. Phosphor bronze owes all its strength to the cold working that goes into producing it.

When both alloys are equally available, grade A will usually be used because, unless extra strength is essential, this material will cost less to procure per pound of usable tensile strength. Since phosphor bronze alloys are produced by cold drawing or rolling entirely and do not respond to any heat treatment except annealing, many of the parts are simply formed and shipped. This practice of spring-making resulted from carelessness in not realizing that, while the alloy did not respond to heat, the stresses trapped in the parts would. A stress relief of 325° to 350° F, after fabricating, will stop much so-called drift, or spring settling.

Phosphor bronze does not stand elevated temperatures very well and should

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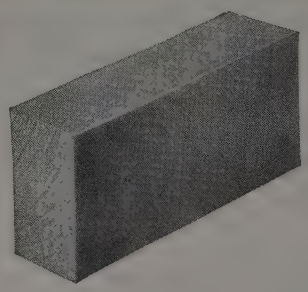
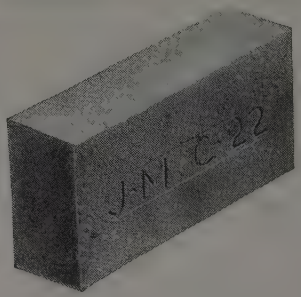
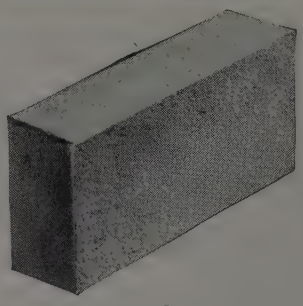


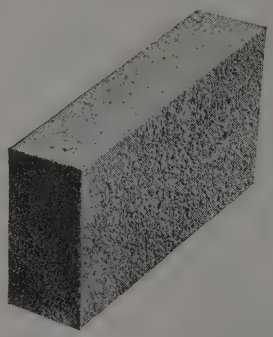
SIL-O-CEL NATURAL—for temperatures to 1600 F. Recommended for back-up service. Provides low conductivity and high crushing strength (400 psi). Cut and sized from natural diatomaceous silica.



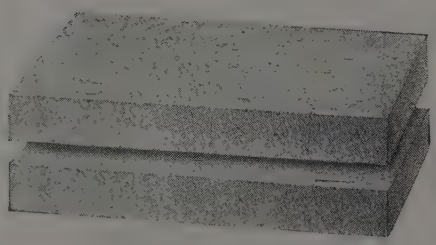
SIL-O-CEL C-22—for temperatures to 2000 F. Exceptional load bearing strength (700 psi). Heat capacity one-third that of fire brick—made from calcined diatomaceous silica.



SIL-O-CEL SUPER—for temperatures to 2500 F. A high crushing strength back-up insulating brick made from calcined diatomaceous silica for exceptionally severe insulating service.

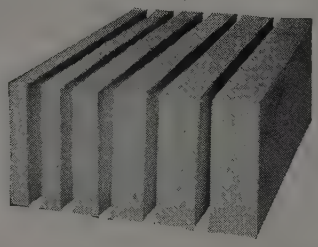


JM-23 INSULATING FIRE BRICK—high in spalling resistance. For use exposed to furnace atmospheres or as back-up insulation for temperatures to 2300 F.



J-M INSULATING FIREBLOK—Similar in composition and properties to J-M Insulating Fire Brick. Each Fireblok is approximately 5 times the size of an ordinary fire brick. Large sizes assure fast, economical installation and reduce number of joints.

JM-26 INSULATING FIRE BRICK—combine light weight with high spalling resistance. For use exposed to furnace atmospheres or as back-up insulation for temperatures to 2600 F.



J-M SUPEREX—For over 20 years unsurpassed as a block insulation for temperatures to 1900 F. Used behind refractory linings more than any other high temperature block insulation. Large size, high heat resistance, light weight, high strength, permanent efficiency.

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NO ONE INSULATING MATERIAL can meet all high temperature service conditions with maximum efficiency. That's why Johns-Manville makes a different insulation for each service requirement. J-M Insulations give you the correct balance of physical and thermal properties for each particular service. Brief descriptions are given above, full details may be obtained from Johns-Manville, Box 290, New York 16, N. Y.

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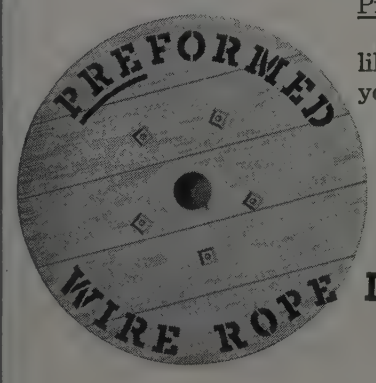
Thousands of dollars for this Crane —*but it can't work!*

● This crane erected on the job cost $41,000. But it can't do a nickel's worth of work until rigged with wire rope costing a fraction of that amount.

The wire rope used makes a big difference, yet for this job Preformed Wire Rope of Improved Plow Steel . . . the best there is . . . costs only about $300. Preformed permits faster, better work, with fewer shutdowns.

Management likes Preformed because it lasts longer. Workmen like it because it's easier and safer to handle. Get the most out of your machines by specifying Preformed of Improved Plow Steel.



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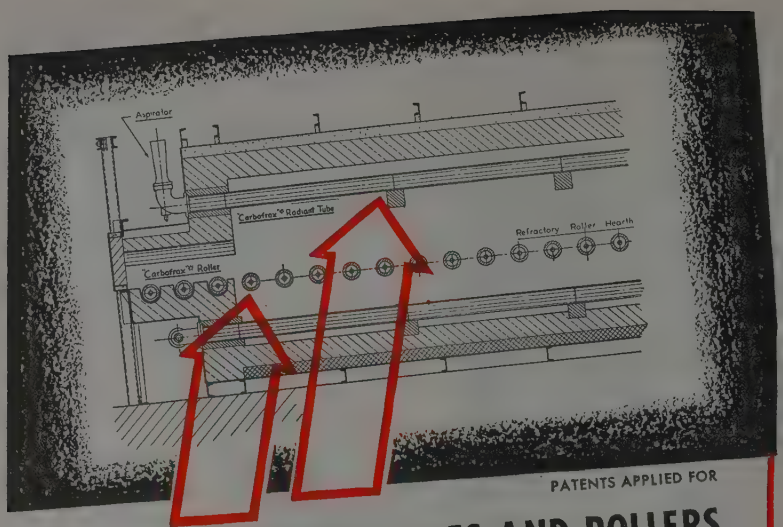

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"CARBOFRAX"* Radiant Heating Tubes and Rollers are not only reducing heat treating costs in conventional furnace operations — but also achieving temperatures up to 2500° F. in special and protective atmospheres with radiant gas heat.

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- Lower initial cost—longer life
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- Freedom from "crankshafting"
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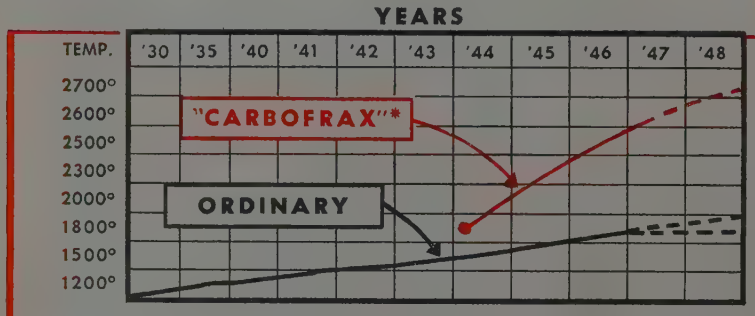
- Low heat loss through insulated water cooling

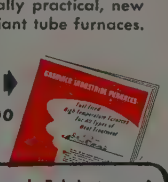
We shall be glad to send you complete information or arrange for an engineer to call.



Development of high operating temperatures with "CARBOFRAX"* as compared with ordinary tubes and rollers. Because these high temperatures are economically practical, new fields are being opened in heat treating with gas fired roller hearth radiant tube furnaces.

*"CARBOFRAX" is a registered trade-mark indicating manufacture by the Carborundum Company.

WRITE FOR FOLDER A-100



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not be used over 225° F at stresses over 20,000 psi, even after the 325° to 350° F treatment suggested. On many electrical uses, static spring loading, and places where the loading is infrequent, phosphor bronze compression springs are stressed 50,000 to 80,000 psi, depending upon wire size. In bending, this corresponds to 100,000 to 150,000 psi.

Beryllium copper is one of the newer copper alloys, but, even so, its commercial use is at least 10 years old. This material now consists of about 2 per cent beryllium in copper. ASTM Specification B120-41T gives the permissible chemical analysis and lists typical properties. Most valuable quality is the fact that it can be formed cold in the soft state and hardened by a simple heating between 525° to 725° F.

This material is the best electrical conductor of any alloy used in springs at anywhere near its hardness. With the advent of an electronic age, use of the alloy will increase markedly. It is strong and has a better fatigue resistance. It does not compare with steel in fatigue life, except under conditions where steel is corroded and copper beryllium is not, nor does it resist the combined effects of heat and stress as steel does. Like all copper base alloys, beryllium copper will not resist corrosion by sulphides which are present in some waters. It resists the common acids, salts, sea water, fresh water, etc., just about as well as pure copper.

Four nickel alloys are most used in springs; they are Monel, K-Monel, Inconel and Z-Nickel. Of these, K-Monel and Z-Nickel are responsive to heat treatment, while Monel and Inconel are strengthened by mechanical working only. All of these alloys are better resistors than the previously discussed copper alloys.

Inconel responds to cold work. Tensile properties vary with material thickness from 160,000 to 180,000 psi. This material is more resistant to heat and corrosion than any other nickel alloy. At reasonable stresses, temperatures of 650° F are permissible, while recent tests have indicated the possibility of making the material go to 900° F under special conditions with some set allowed. All Inconel springs should receive a stress relief temperature of 900° F for at least 1 hour. They will have a rockwell 30 to 40 C, as the size goes from ⅜-in. wire downward, or ⅛-in. sheet and thinner.

When employed in compression springs, the curves shown in Fig. 5, taken from the work of Betty, MacQueen and Rolle in the *Transactions* of the American Society of Mechanical Engineers of 1942, give a quick summary of these alloys and heat. All stresses reported are corrected for curvature.

One of the important alloys of nickel

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is called Elinvar. This material is used in scale springs, hair springs, watches, bourdon tubes, tuning forks and similar installations, because of its constant modulus from minus 150 to plus 300° F. There are several Elinvars available, but most of their compositions will fall into the table given in *Metal Progress* by G. E. Shubrooks, Vol. 21, Page 58.

Nickel	33.0—35.0
Iron	61.0—53.0
Chromium	4.0— 5.0
Tungsten	1.0— 3.0
Manganese	.5— 2.0
Silicon	.5— 2.0
Carbon	.5— 2.0

As can readily be seen, this material would be austenitic and can only be hardened by cold work. As a result, the elastic limit is about 45,000 psi, and in use it is limited to stresses considerably under this.

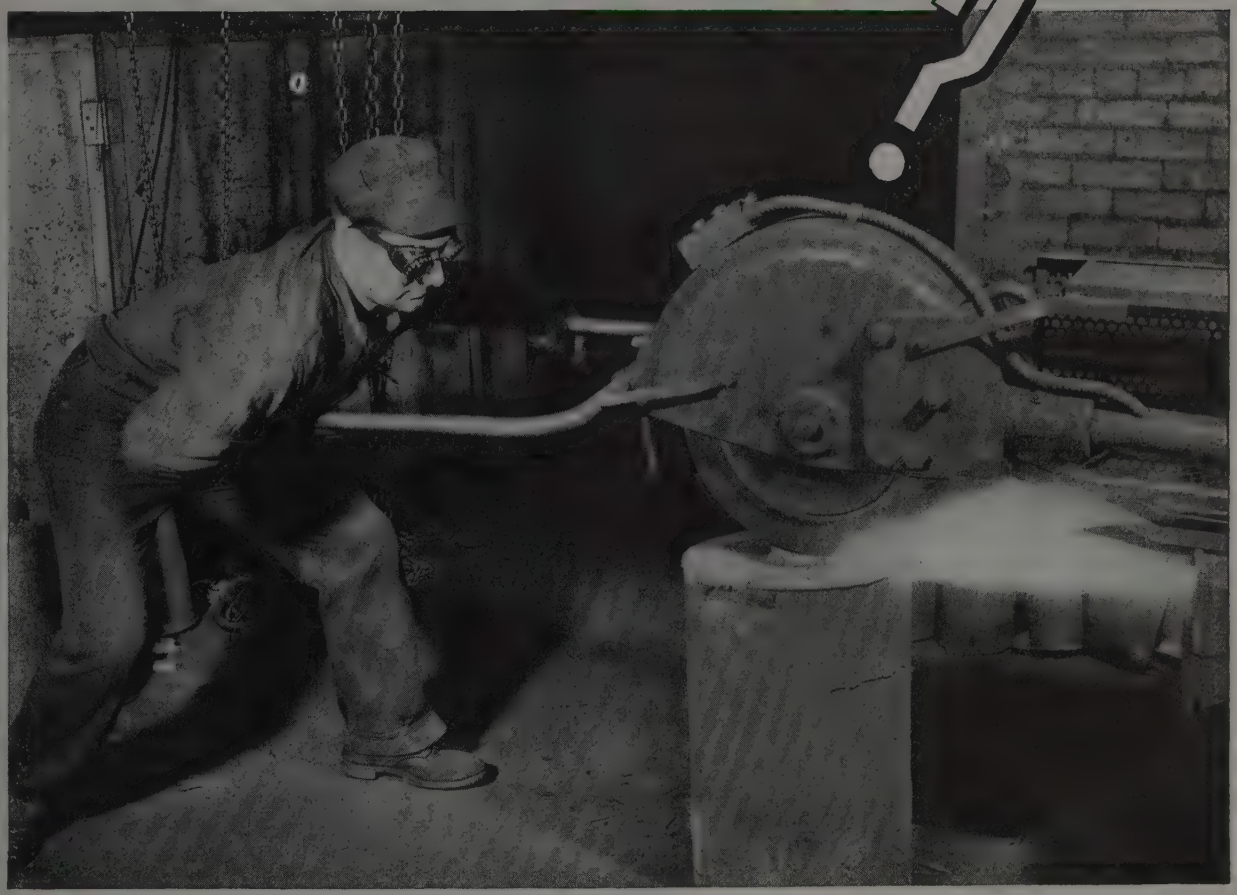
Ferrous Materials: The heavy spring industry forms all kinds of springs, whether helical, flat or volute, while the material is hot. Most of these springs are of steel which has to be heated above the critical range to be able to produce them. Steel employed is usually a hot rolled product.

Helical hot coiled springs are usually made so that the spring can be pressed solid. This cold setting is simply a loading of the spring beyond the yield strength resulting from the heat treating. Set may vary from a small amount to an amount equal to the intended spring travel from free length to solid height and the springs must be coiled long enough initially to allow for this set. Cold working of the compression spring induces trapped stresses and will raise the yield point of the spring. When this setting is employed, the entire cross section of the bars is in plastic shear and the maximum load sustained depends upon the yield strength in shear over the entire cross section. Heating and forming of springs made from ground rod must be carefully controlled; otherwise scale and decarburization can easily be produced that will result in a surface as bad or worse than the original hot rolled finish.

Heat treatment of flat springs is usually combined in part with forming. Leaves or main leaf with the eyes rolled, pass through a furnace and are placed on a forming machine which gives part necessary arc and then submerges spring in an oil quench. After this, parts are drawn to the desired hardness. In helical coiled springs, there are two methods in use. The first is to heat the rod to the coiling temperature, coil and quench directly from the mandrel.

This avoids further heating and rescaling. It can be used only where bars are not too long so as to cool in coiling and requires a definite sequence of op-

HOW SMOOTH IS "Rough"?



THE smoothness of snagged pieces is relative. Too often, the snagger passes them along as "smooth enough" and the receiver complains that they are "too rough." Why any extra minute devoted to snagging is begrudged, is easily understood. It is just as easy to understand why receivers resent having to complete the snaggers' job. You can afford a snagging job that will satisfy any "next man," if you switch to Electro HIGH-SPEED SNAGGING WHEELS. They are unbelievably fast. They remove metal with outstandingly low cost. They work equally well in portable, swing-frame and floor-stand grinding machines. Each is precision-engineered to the specific job you use it on. Let us demonstrate in *your* plant on *your* work.

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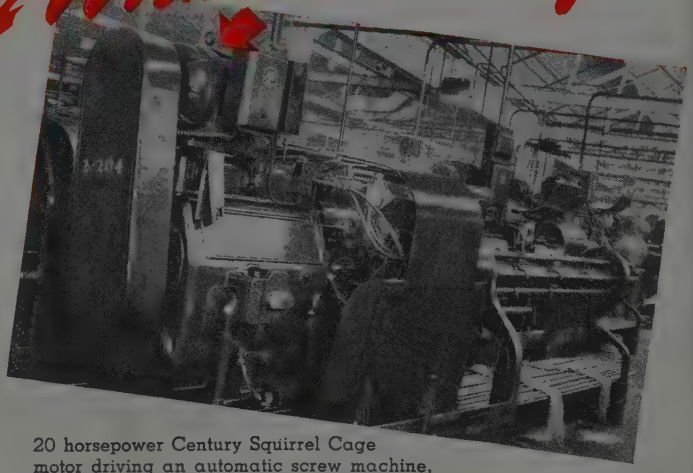
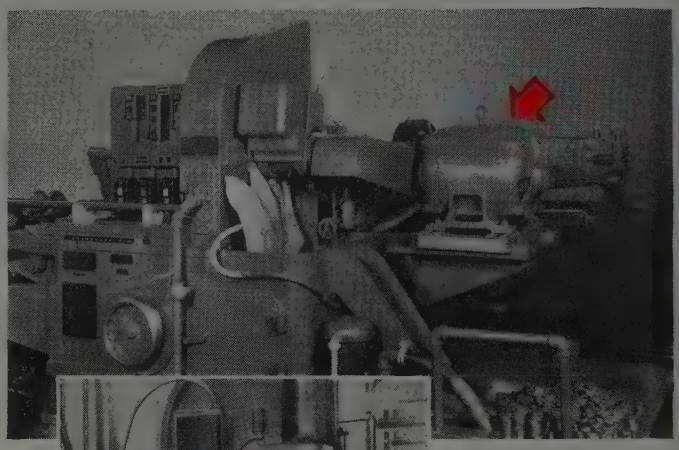
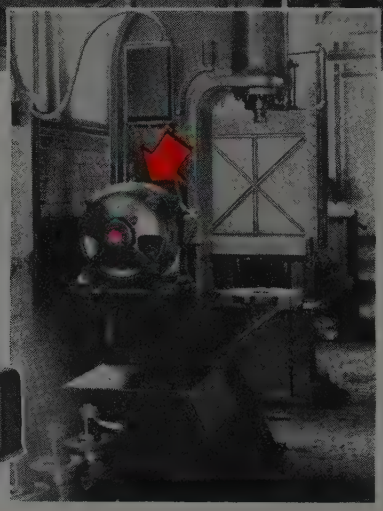


20 horsepower Century Squirrel Cage motor driving an automatic screw machine.



10 horsepower Century Squirrel Cage motor driving an abrasive cut-off machine.



7½ horsepower Century Squirrel Cage motor driving a pump on a hydraulic press.

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erations properly timed—a condition very difficult to obtain. Second method is to cool springs after forming and then reheat to proper temperature for quenching. This method has the advantage of a control of the quenching temperature and is less liable to human error.

Hot formed spring steels vary in stress-carrying ability with surface condition and size of section. For parts that are subject to maximum loading infrequently, a ¼-in. thick leaf, for example, is often stressed 120,000 to 130,000 psi in bending, whereas its endurance limit might not be half of this amount. With helical coiled springs, stress ranges to 130,000 or 45,000 psi can be obtained, but if the material is pitted or has a very poor surface, much lower values must be used. Thus, on front wheel suspension for automobiles, stress ranges, corrected for curvature of 60,000 to 120,000 psi, or even 80,000 to 130,000 psi are used. It should be pointed out that the higher stress is probably not reached 50,000 times in the life of the vehicle.

With this general background, let us examine the usual materials used by this division of the spring industry. First, we find SAE 1095 steel as one of the oldest, and even today a very popular steel. This material is used in either round or flat. The usual physical properties are tensile strength of 200,000 psi and a yield strength of 135,000 psi. It is a shallow hardening steel, and for oil quenching the critical section is a ⅜-in. diameter bar.

SAE 1085 and 1090 steels are much better spring materials than 1095. Their physical properties are the same, but the average hardenability is much better. Because of the higher manganese content and a carbon content approaching eutectoid, these steels show greater endurance values than 1095.

Most popular alloy steel in use in the heavy springs is SAE 9260, or 9262, if very heavy sections are encountered as bars over 1 in. in diameter. These silico-manganese steels have a yield strength of 180,000 psi, or 30 per cent higher than carbon steel. The material can be made harder than carbon steel and still be no more brittle. Resistance to heat, especially up to 450° F, as in mechanical springs, greatly exceeds carbon steel. Faults of the material are its tendency to be a dirty steel, seams, and its being subject to decarburization more easily than carbon steel. As a result of these factors, manufacture of this steel has to be carefully watched to minimize troubles. It is used in leaf, coil and volute springs.

SAE 6150 was, before the war, employed in a number of leaf and coil springs. During the war, the shortages of vanadium and chromium practically

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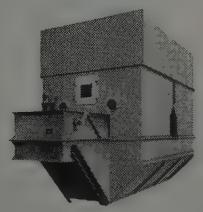

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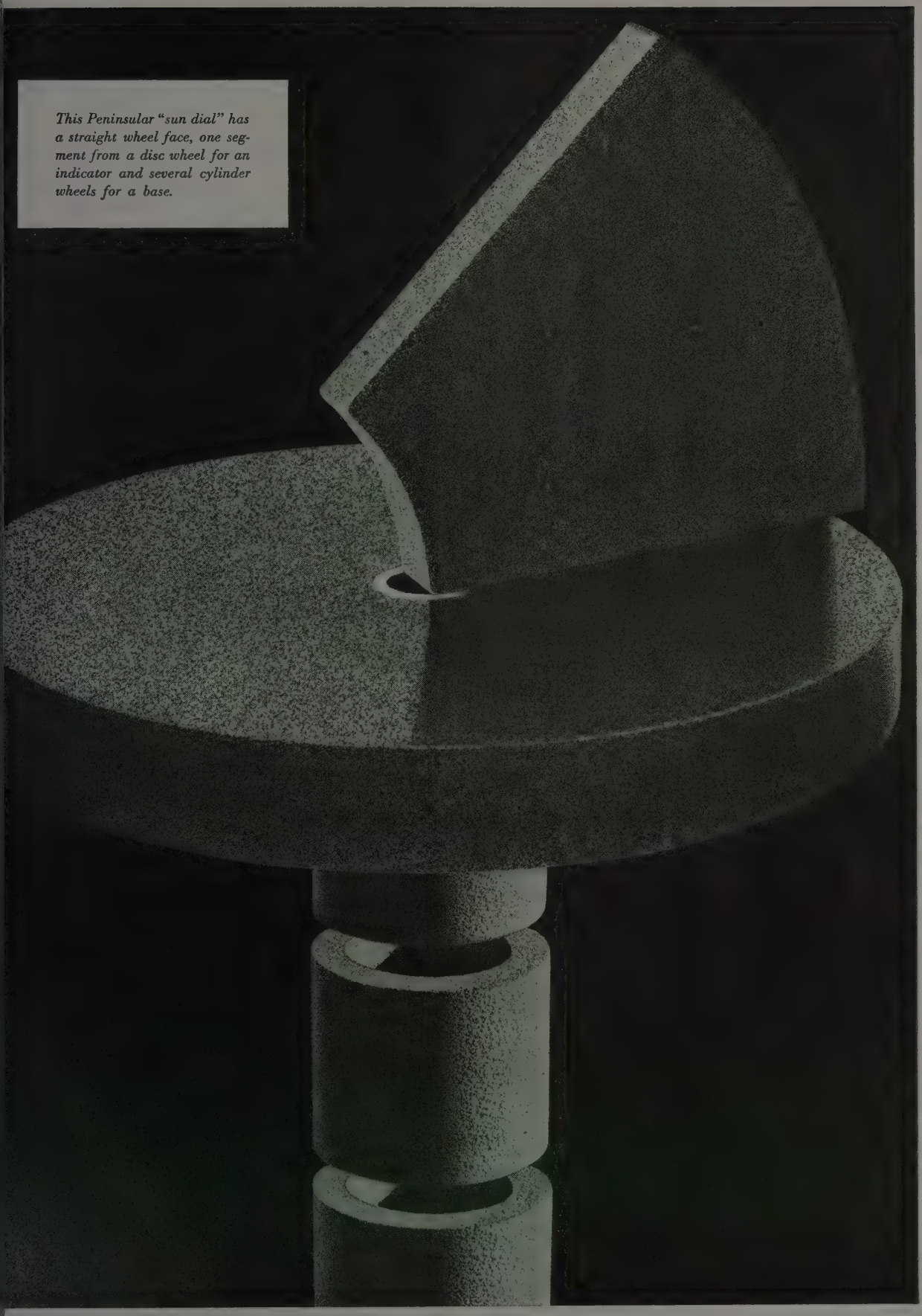

This Peninsular "sun dial" has a straight wheel face, one segment from a disc wheel for an indicator and several cylinder wheels for a base.

MECHANICAL PROPERTIES OF STAINLESS W

	Annealed	Aged at 950° F.	Aged at 1000° F.	Aged at 1050° F.
Condition	120/150000 psi	195/225000 psi	190/220000 psi	170/210000 psi
Tensile Strength				
Yield Strength (.2% offset)	75/115000 psi	180/210000 psi	170/210000 psi	150/185000 psi
Hardness RC	22/28	39/47	38/46	35/43

removed it from the hot-formed field and it was replaced with silico-manganese steel which, for the use intended, was cheaper and had equivalent strength. It has an advantage over silico-manganese steel in a lesser tendency toward decarburization.

Another series of steels being favorably considered by the heavy spring industry are the 8600 series, 8650 to 8660. These have the same strengths as silico-manganese, a little better ductility for the same hardness.

Steels, as 5150 or 4150, have been successfully used in many automotive parts, but they have not made much headway outside of this industry. The hot coiling of high speed steel for safety valve springs, where steam is preheated to high temperatures, is common. Reasons for use are same as in smaller sizes, namely, resistance to temperature.

Hot forming of nonferrous materials is very infrequent. Usual alloy considered is K-Monel or Z-Nickel which can be given good physical properties by heat treatment. Of the copper alloys, beryllium copper, only, is possible to so use. Materials, when employed, are used for the same reasons as given in the mechanical spring material outline.

Upholstery Spring Industry

This branch of the spring industry uses a smaller variety of materials than any other. The volume, however, is very large. Ideal cushion spring material would be one wherein tensile strength is high and elastic limit nearly zero. Then the machines could knot the wire readily and various bends could be produced with ease. This material should then, with low temperature heating (about 450° F), recover a high elastic limit and the product in consequence have the desired resiliance in use. This ideal condition is never approached very closely, but cold drawn products will act in the desired manner better than any others.

For springs in cushion or upholstery work, SAE analysis 1066 is most frequently employed. Physical properties for cold drawn wire of this composition are listed by ASTM in specification A227-41. Usual tensile figures vary with the wire size and also with use to which wire is to be put. Thus, if wire size 0.120 were used in springs, a minimum value of 215,000 psi might be specified with 240,000 psi as a maximum. If the wire were to be used for braces, border wire, arches, hooks, or other formed parts, a lower value of 185,000 to 210,000 psi would be employed.

For flat parts, SAE 1010 sheet is used. It is obtained bright as cold rolled, and also with a slight scale when hot rolled. If pickled to remove this scale, it is then oiled to prevent corrosion. This material is used in clips, braces, and other simple stampings.

When spring steel is needed in flat sections, SAE 1065 or 1064 can be used. It is continuously heat treated in the manner described under clock spring steel, but is not polished and has a black appearance. Hardness in thin sections, less than 0.020-in. is usually equal to C 44-48 rockwell. Over 0.031-in. a C 40-44 is used. From 0.021-in. through 0.030-in. an intermediate hardness of C 42-46 is preferred. This steel is used for flat springs, simple forms, and for braces where flexing is necessary.

From data presented at SAE summer meeting, June, 1947.

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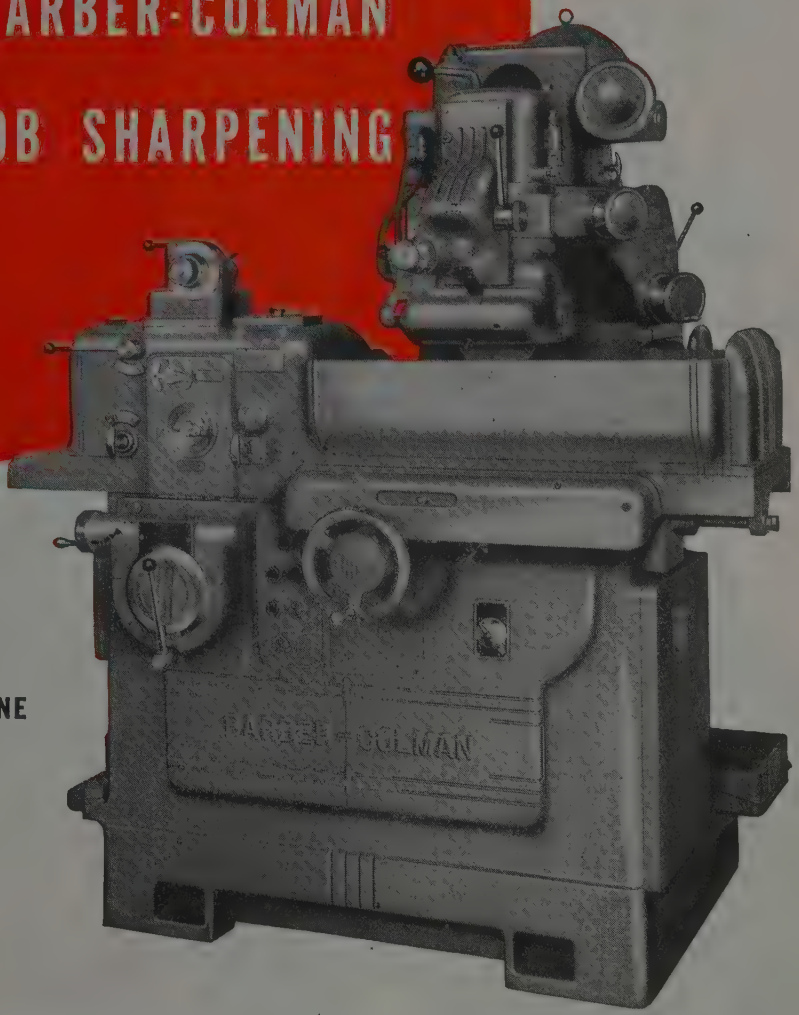
A new BARBER-COLMAN AUTOMATIC HOB SHARPENING MACHINE



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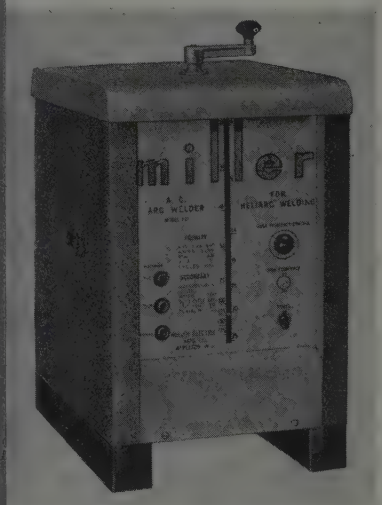
New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 134

1. AC Welder

Miller Electric Mfg. Co., Appleton, Wis., announces a new series of alternating current welders designed for the Linde Heliarc process. This process requires a welder of heavier construction. Adjustable high frequency current and



high duty cycle ratings are incorporated in the units.

High frequency unit is equipped with variable control, enabling the operator to change or vary the voltage of the high frequency circuit for any application. This process has made possible welding of aluminum without flux, as well as having many advantages in the welding of magnesium, stainless steel, high carbon steels, high alloy steels, brass, Everdur, Monel and copper.

2. Magnetic Chucks

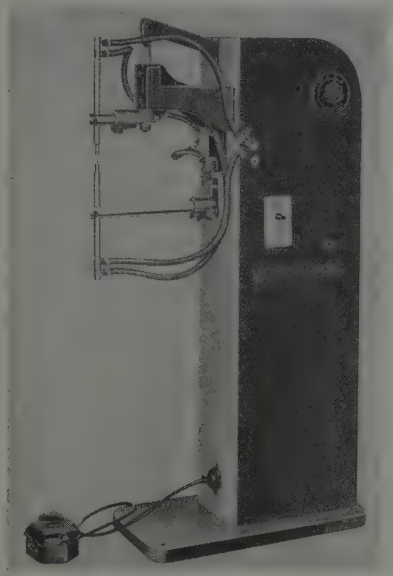
No installation or maintenance cost are advantages of permanent magnetic chucks made by O. S. Walker Co. Inc., Worcester 6, Mass. Transfer from one machine to another is without use of additional equipment; chucks retain their holding power indefinitely. Chucks range in size from 2⅞ x 6½ in. to 5⅞ x 21½ in. magnetic surface). Special chucks of other sizes are available.

3. Conveyor Belt

Rayon cord plies as a strength member are incorporated in the conveyor belt developed by Manhattan Rubber Division of Raybestos-Manhattan Inc., Passaic, N. J. Designed to meet the needs of mechanized coal and metal mines, quarries and limestone plants for a belt of high tensile strength, the belt troughs easily, can utilize conventional type idlers and pulleys, can be conventionally field-spliced and permits construction modifications to suit varying service conditions.

4. Spotwelders

Designed with a high power-space ratio for continuous production welding on thin metals up to two thicknesses of 14-gage cold rolled steel or equivalent, a series of high speed, fully automatic,



air operated, electronically timed spot welders, made by Weldex Inc., 7330 McDonald avenue, Detroit 10, are rated at 7½ kw. Series consists of model 752-P, press action type, and model 752-R, rocker arm type.

Welders have a built-in transformer, tap changing switch, solenoid air valve, single-acting air cylinder, adjustable air operated pilot switch, magnetic contactor and electronic timer which automatically controls all phases of the welding cycle. Welding tips and transformer are water cooled as are electrode holders.

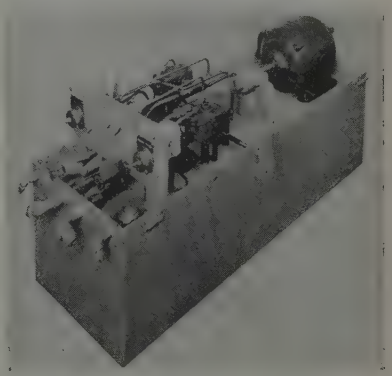
5. Abrasive Sticks

Sandusky Abrasive Wheel Co., 710 West Ransom street, Kalamazoo, Mich., is marketing flexible abrasive sticks made of graded abrasive grains bonded in high quality rubber for a wide variety of uses. They are made in three grades in various sizes and shapes for light grinding, cleaning, deburring, rust removal, sharpening, honing, polishing, etc. Sticks may be shaped by cutting for irregular or hard-to-get-at places or may be fastened to a lathe tool post.

6. Hydraulic Power Unit

Built for activating any hydraulically driven machinery, the new hydraulic power unit, announced by Hufford Machine Works, Redondo Beach, Calif., is completely self contained with motor, pump, valves and flow controls mounted above the hydraulic fluid reservoir and filter system.

Unit is completely enclosed in a cover, preventing entrance of dust and foreign matter. Built-in selector valves enable both forward and reverse motion of the machine to which power unit is applied. Meter flow controls permit speed of the



driven mechanism to be varied over a wide range.

Sizes from 1 to 50 hp are available. A variety of types from a single motor driven pump to complicated systems for all automatic systems are are also available.

7. Duplex Micrometer

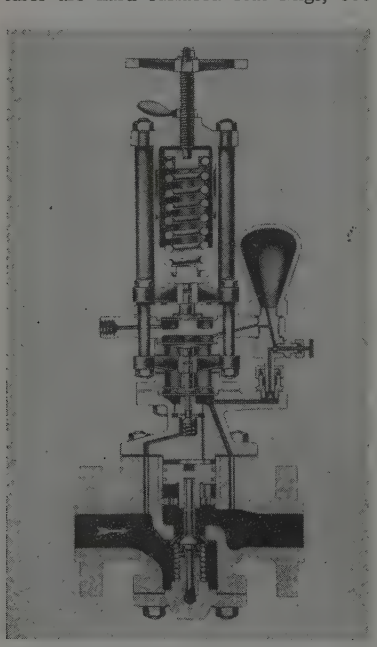
Internal and external measurements are possible with the Rimat duplex micrometer, made by Richards Machine Tool Co., 124 South Isabel street, Glendale 5, Calif. Its positive reading characteristic eliminates errors and makes for speed and accuracy on the job.

Instrument is made in 0-1, 1-2 and 2-3 in. sizes, with special sizes available upon order. Ends of measuring pins are hardened and ground on a radius for ac-

curacy and to prevent cramping. All wearing surfaces are hardened and ground and may be adjusted when necessary.

8. Pump Governor

Pump governors designed for accuracy of control and to resist wear and erosion are announced by Leslie Co., 152 Delafield avenue, Lyndhurst, N. J. Features are hard surfaced seat rings, 800



brinell hardened stainless steel main valve and 500 brinell hardness cylinder liner, all of which serve to reduce wear. Hard seating surface is applied as a welded section to seat rings of bronze governors and to the main body of steel governors.

Governors may be accurately regulated, permits settings without change of spring or diaphragm. They are available in sizes from ½ to 4 in. for inlet pressures from 40 to 600 psi at temperatures to 750°F.

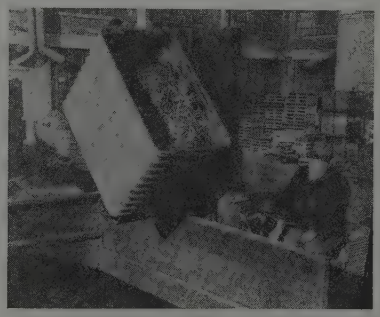
9. Water Lift Pump

Air foil principles are utilized in the Hydro-Foil pumps of the propeller and mixed flow types developed by Peerless Pump Division of Food Machinery Corp., 301 West avenue 26, Los Angeles 31. Designed for low and medium lifts with maximum pumping capacities, these pumps may be used in virtually all dewatering and drawing-off applications where large quantities of water must be moved quickly. Capacities range from 600 to 220,000 gpm against heads from 2 to 60 ft.

A choice of drives from 1 to 1000 hp is given the user. Drive may be by motor mounted on pump, through gears on pump from a vertical driver, by v-belt pulley mounted on pump or by conventional belt drive. Units may be close-coupled for applications where large water capacities are required from short settings.

10. Tote Box Dumper

Tote boxes filled with scrap or refuse for dumping or other similar lift truck loads may be unloaded directly with no intermediate handling by the device developed by Clark Tructractor Division of Clark Equipment Co., Battle Creek,

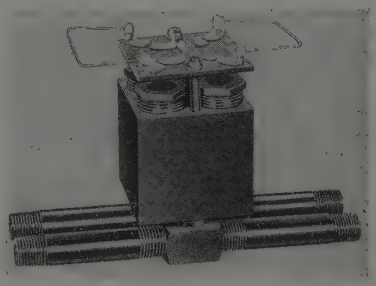


Mich,. which rotates the truck's entire fork assembly.

Operated by hydraulic motor and gear reduction, the rotating mechanism is adaptable to fixed or adjustable forks, scoop and other special attachments. Savings in time and manpower are possible as manual operations are eliminated.

11. Gas Testing Unit

An accurate means of observing gases by the thermal conductivity method is possible with the new testing unit developed by Gow-Mac Instrument Co., 22 Lawrence street, Newark 5, N. J. Features are its low cost, flexibility in gas



train sampling and fact that no special instruments are required in using it.

Unit incorporates four filaments assembled in appropriate chambers and wired in a balanced bridge arrangement. Each of the four elements conforms to a predetermined standard of resistance. When used with a suitable source of constant voltage, the degree of unbalance of the bridge circuit provides an accurate measure of the relative thermal conductivity of an unknown gas or the quantitative variation in a known gas. Unit may be used with indicating, recording or controlling instruments.

12. Vacuum Cleaner

An industrial vacuum cleaner, announced by Breuer Electric Mfg. Co., 5100 North Ravenswood avenue, Chicago 40, is a multipurpose unit which may be used as a portable blower for cleaning

motors and machinery by detaching the motor, or as a light weight, portable vacuum cleaning unit.

Designated as Model 90, its motor is mounted in the top of the tank, lowering the center of gravity. Motor is mounted on molded rubber. With the addition of a larger bag, unit may be used as a furnace cleaner.

Cleaner is powered by a 1-hp General Electric motor and has a 49 in. waterlift. Its 29 in. high tank holds 12 gal of chips, scrap and heavy particles. It is mounted on rubber casters. A smaller model with 3/5-hp motor, 36 in. waterlift and 10 gal tank is also available.

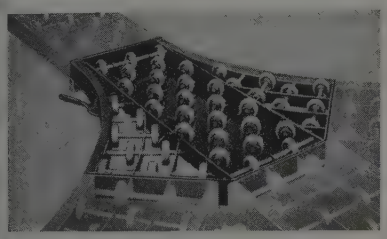
13. Layout Fluid

Fluid for layout work on all tools, dies, jigs and fixtures and machine castings which is applied simply by wiping the surface clean and brushing on, is being marketed by Dayton Rogers Mfg. Co. of Minneapolis. Drying instantly, the lines scribed in it have a pronounced contrast against the dark background,

the company states. It may be used on all materials, including brass, aluminum, stainless steel, copper etc. A polished surface is not necessary.

14. Conveyor Switch

Direction of flow through a 3-way roller conveyor switch is instantly changed to any of three directions by a hand lever, this new unit being manufactured for use with Roll-or-Wheel con-



veyors, made by the E. W. Buschman Co. Inc., Cincinnati 32. Aligned "pivot" wheels in center portion of switch are integrated by an arrangement of levers controlled at a single point.

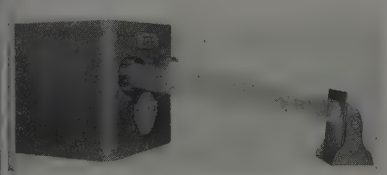
Wheels in this center section are raised slightly above the wheels in the spin section, eliminating any drag in the switching operation. Rustproof wheels are used throughout. Switch weighs 56 lb and requires no maintenance or adjustment.

15. Work Glove

Soft and flexible and with a nonslip surface that facilitates gripping and increases protection, the Super Canton work glove, made by Riegel Textile Corp., 342 Madison avenue, New York 17, is intended for extra long wear. The glove bears the company's Wagon Brand name, is water repellent and has a knit wrist.

16. Photoelectric Counter

Light source, phototube and counter are combined in one unit in the No. 153 photoelectric counter, made by Ripley Co. Inc., Middletown, Conn. Unit op-

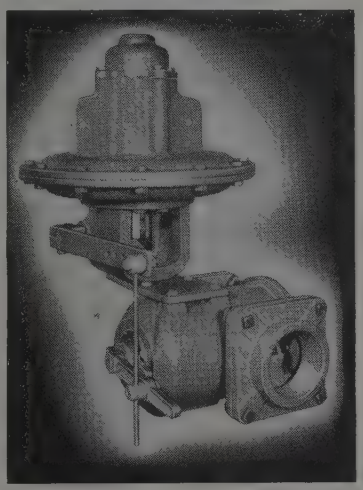


erates on interruption of reflected light from a swivel type, adjustable chromium reflector. Functioning on 115 v, 60 cycle current, it has a sensitivity adjustment which may be reached through an aperture in the housing, permitting settings for various light intensities.

Relay will carry a load of 3 amp continuously for 8,000,000 impulses. Minimum time for 1 cycle is 0.08-sec or 700 cycles per minute. Minimum duration of beam interrupting a 1 in. object is 0.02-sec. Minimum light intensity is 2 ft-c. Number of counts before returning to 0 is 99,999.

17. Air Motor

Designed for use with adjustable port valves which have the adaptability feature necessary for straight-line flow control, the new series 600 diaphragm air motor, announced by North American Mfg. Co., 4455 East 71st street, Cleve-



land 5, may also be used wherever the need for pneumatic control might arise. Pneumatic controller air pressures of 0 to 15 psi afford an impulse pressure range of 3 to 15 psi to the diaphragm motor which results in full travel of the motor arm (26 degrees) and develops 25 lb-in. torque for 1 lb change in impulse pressure.

Provisions have been made in the diaphragm motor for a valve positioner to obtain the maximum in valve response accuracy. Mounting lugs are provided for fastening to supports independent of the piping. It may be mounted in any position relative to the piping.

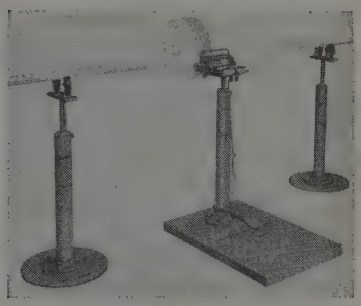
18. Drill Lathe

A unit which may be used to convert any bench or floor model drill press with 2½ or 2¾-in. diameter column into a wood turning lathe is announced by Nobur Mfg. Co., 910 North Orange drive, Los Angeles 38. Called the Dril-Lathe, it may be installed as a permanent part of the drill press. Work up to 36 in. may be turned. Regular drill press speeds apply to turning operations.

FOR MORE INFORMATION
on products and equipment described in this section, fill in a card following page 134.

19. Tube Support Stand

Uniform polishing and more efficient handling of long tubing on semiautomatic tube polishing machines is possible with the Presto tube support stand, designed by Manderscheid Co., 810 Fulton street, Chicago 7. Tubing rests on two



rubber wheels located on top of tube support stand.

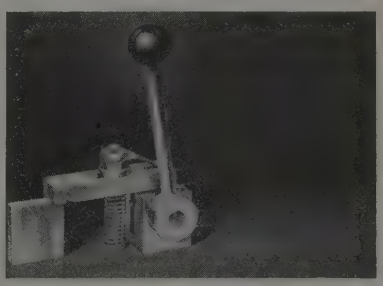
By adjusting angle of wheels, movement of tubing across polishing wheel or abrasive belt may be regulated to the required speed. Stand will hold tubing from ¾ to 5 in. diameter and is adjustable from 28 to 38 in. high.

20. Mechanical Pencil

Choice of six different colored leads is offered in the mechanical pencil developed for use by engineers, architects, draftsmen, etc., by Ross-Frederick Corp., Box 429, Mineola N. Y. Strong, almost unbreakable leads are contained within the barrel, selected by adjusting the metal clip attached to the head. Three-section chuck holds chosen lead firmly in writing position. Lead color sight selection is afforded by small colored dots enbedded in the barrel.

21. Cam Fixture Clamp

An automatic cam clamp, announced by West Point Mfg. Co., 19625 Merriman court, Farmington, Mich., automat-



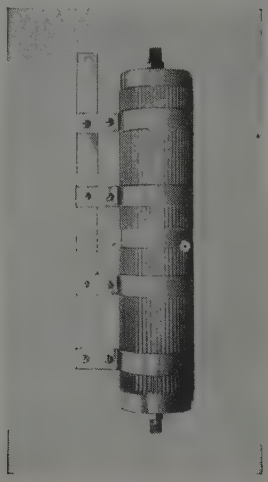
ically advances or retracts the clamp strap to or from the work by one hand operation of the handle. Its built-in, rest block makes the clamp a complete

unit easily attached to a fixture by drilling three holes.

Handle may be mounted in any position for right or left hand operation. Clamp is made of alloy steel, cadmium plated. Strap, cam and pin are heat treated. Spherical washers with ground radii are used to compensate for irregularities in work. Clamp may be adapted for operation by an air cylinder.

22. Selium Rectifiers

Selenium rectifiers produced through a new method of electrolytically depositing selenium are a development of Ion Industries Inc., Chicago 27, Ill. Cylindrical in shape with circulating liquid cooling for more efficient heat dissipation to



produce high amperage capacity, the rectifiers are constructed in standard unit elements, assemblies being made in the number needed for the output in amperes and voltages required.

Units may be used in metal deposition, metal refining, metal surface treatment and welding applications of large amperage demands. Hermitical seal of surface area assures long life and trouble-free operation. Rectifier illustrated is the standard S-300 unit with continuous rating of 250 amp or intermittent rating of 500 amp.

23. Motorized Valve

Automatic Temperature Control Co. Inc., 34 East Logan street, Philadelphia 44, is announcing a new, compact motorized valve for use with steam, air, gas, oil or water in commercial machinery and equipment, heating and air conditioning systems, heating and cooling coils, etc. An induction type motor develops a positive power drive through a worm and spur gear reduction. Limit switches are adjustable.

Cast iron motor housing is dust tight and splash proof and all parts are easily accessible. Electrical connections are made to a terminal block. It requires a 3-wire thermostat, pressure switch or other similar instrument for actuation. Operation is from 24, 110 or 220 v ac power source.

Globe type, all bronze, either single or double seated valves in sizes from 1/2 to

2½-in. with screw end connections and butterfly type with iron body and bronze trim in sizes 1 to 4 in.; either screwed or flanged ends are available.

24. Welding Electrode

Tensile strengths up to approximately 150,000 psi may be produced with the Airco No. 190 electrode manufactured by Air Reduction Sales Co., 60 East 42nd street, New York 17. Features are: Minimized necessity for preheating when welding high strength chrome-alloy aircraft steels; it is less conducive to cracking adjacent to weld area and between areas of weld metal when preheating is not applied; and welds are very ductile. It is suitable for operation on direct current, straight polarity or on alternating current with a medium-long arc suggested.

25. Infrared Rustproofer

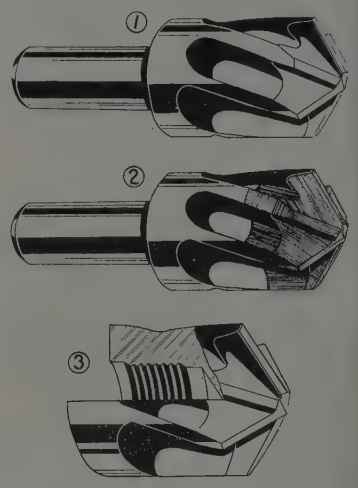
Rust inhibiting surfaces may be produced with considerable savings in time, labor and equipment using the infrared burn-off process developed by Burdett Mfg. Co., 3433 West Madison street, Chicago, Ill. along with that company's gas fired infrared burners.

Rustproofing by this process consists of scientifically placing burners in relation to work. The treatment not only removes grease and similar film but simultaneously produces a blue surface on the metal that is extremely rust resistant. It is a tight scale which reaches hidden surfaces. Paint adhesion to this surface is satisfactory.

26. Countersinks

Severance Tool Industries Inc., 726 Iowa avenue, Saginaw, Mich., announces three new chatterless countersinks which feature shear-cutting teeth staggered both as to spacing and shear angle which eliminates chatter and results in faster cutting of seats with a better finish.

Three new types are (illustrated as 1, 2 and 3, respectively): Countersinks with



a 60 degree angle with c/1 are made standard in nine sizes up to 1 in. diameter; countersinks with cemented carbide in sizes up to 1½-in. and in same angles (30, 41, 45 and 60 degrees) as high speed tools; and countersinks with threaded bodies in sizes 1 in. and larger, body dimensions being the same as for standard tools having integral shanks.

27. Cable Marker

After plugging into any 110-220 v ac outlet, the concaved style Acrohex electric cable brander, manufactured by Acromark Co., 398 Morrell street, Elizabeth 4, N. J., reaches sufficient heat to brand most cable insulation materials with code markings or other information in 1 min. Code marking die is deeply engraved for clear marking and characters are concaved to fit contour of cable in a wide range of sizes.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Steel Market Continues in Ferment on Price Changes

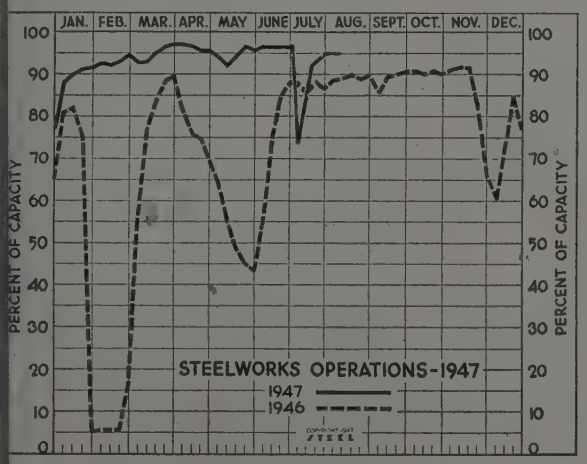
Stabilization of situation unlikely for some time pending clarification of conditions arising from recent price revisions. Trade focusing attention on scrap which appears at or near peak. Consumer demand for steel products continues insistent

ALTHOUGH steel buyers, for the most part, are accepting the recently announced price increases on steel products with a minimum of "beefing," expectations were last week that some little time will elapse before the market becomes stabilized at the higher levels. Clarification of the market is still needed to enable consumers to get a sufficiently clear picture of the situation for them to chart firm purchasing policies.

For one thing, confusion is rampant because of dual base prices on some products resulting from announcement by U. S. Steel Corp. subsidiaries of increases on certain semifinished and finished items in lesser amounts than had been effected earlier by leading independent producers.

Then also, adding to the confusion, is the fact that all producing interests have not yet acted on their price schedules. For instance, all sellers of narrow strip have not yet announced lists, and in the case of wire products while the leading producer has announced increases on some products, its list probably will not be completely revised for another few days. Meanwhile, some other wire sellers have not yet taken action of any kind but likely will do so shortly. These additional price announcements promise to keep the market in a ferment, and with raw material prices soaring, such as on scrap, there is no certainty the new steel schedules will hold long.

At the moment trade attention is focused increasingly on scrap. Steelmaking grades are quoted above pig iron, and in some instances above semifinished steel, and it appears the market is almost entirely out of hand. Late last week it appeared a correction of the runaway situation might be in the making with most steel mills out of the market and displaying increasing resistance to offered prices. In fact, observers at some points thought the market had about reached the top. Despite buying resistance, however, prices continued to rise, last week being marked up on No. 1 heavy melting sales from $1 to $3 per ton at various consuming points. Broker-dealer transactions at $44 and $45 per ton were reported, but so far as can be determined $42 to $43 more accurately reflects the market in the Pittsburgh district. At Chicago a large consumer of No. 1 heavy melting steel paid $42.50 a ton delivered, this sale boosting the market by $3 to a new all-time high in the district.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Aug. 9	Change	Same Week 1946	Same Week 1945
Pittsburgh	100.5	+ 0.5	97.5	86
Chicago	94	None	89.5	93
Eastern Pa.	94	None	84	87
Youngstown	92	+ 2	88	80
Wheeling	93.5	+ 4.5	86	96.5
Cleveland	91	— 2	92	92
Buffalo	88.5	None	88.5	81.5
Birmingham	99	None	99	95
New England	90	None	75	86
Cincinnati	87	— 7	89	87
St. Louis	84.5	None	49.5	68
Detroit	92	None	89	89
Estimated national rate	95	None	89	88.5

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.

Pressure for steel deliveries is unrelaxed. Most sellers of hot-rolled carbon bars are promising about the same allotments for fourth quarter as they had set up for the present period, which is disappointing to consumers who had anticipated something in the way of increased tonnage.

For the third consecutive week, steelmaking operations held unchanged last week at the estimated national rate of 95 per cent of capacity. Increases of 4½ points to 93.5 per cent in Wheeling, 2 points to 92 per cent in Youngstown and ½ point to 100.5 per cent in Pittsburgh were offset by declines of 7 points to 87 per cent in Cincinnati, where two open hearths were removed to provide a reserve, and of 2 points in Cleveland, where Republic Steel Corp. took off one furnace for repairs. Rates held unchanged in other districts.

STEEL's composite price average for steelmaking scrap advanced to a new postwar high of $41.75 from $40.42 for the preceding week. The price average for steelmaking pig iron held unchanged at $35.61, although undertone of the market was strong as the Swedeland producer advanced prices $2.50 a ton. Composite market averages on finished and semifinished steel held at the revised figures of $75.41 and $56.80, respectively.

COMPOSITE MARKET AVERAGES

	Aug. 9	Aug. 2	July 26	One Month Ago July, 1947	Three Months Ago May, 1947	One Year Ago Aug., 1946	Five Years Ago Aug., 1942
Finished Steel	$75.41	*$75.41	$69.14	*$70.80	$69.82	$64.45	$56.73
Semifinished Steel	56.80	*56.80	52.10	53.04	52.10	40.60	36.00
Steelmaking Pig Iron	35.61	35.61	35.61	33.82	32.49	27.50	23.00
Steelmaking Scrap	41.75	40.42	39.08	37.23	29.75	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

* Revised.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	Aug. 9, 1947	July, 1947	May, 1947	Aug., 1946
Steel bars, Pittsburgh	2.90c	2.66c	2.60c	2.50c
Steel bars, Philadelphia	3.28	3.06	2.98	2.86
Steel bars, Chicago	2.90	2.66	2.60	2.50
Shapes, Pittsburgh	2.80	2.56	2.50	2.35
Shapes, Philadelphia	2.94	2.70	2.64	2.48
Shapes, Chicago	2.80	2.56	2.50	2.35
Plates, Pittsburgh	2.95	2.71	2.65	2.50
Plates, Philadelphia	3.15	2.91	2.85	2.558
Plates, Chicago	2.95	2.71	2.65	2.50
Sheets, hot-rolled, Pittsburgh	2.80	2.56	2.50	2.425
Sheets, cold-rolled, Pittsburgh	3.55	3.27	3.20	3.275
Sheets, No. 10 galv., Pittsburgh	3.90	3.63	3.55	†4.05
Sheets, hot-rolled, Gary	2.80	2.56	2.50	2.425
Sheets, cold-rolled, Gary	3.55	3.27	3.20	3.275
Sheets, No. 10 galv., Gary	3.90	3.63	3.55	†4.05
Strip, hot-rolled, Pittsburgh	2.80	2.56	2.50	2.45
Strip, cold-rolled, Pittsburgh	3.55	3.27	3.20	3.05
Bright basic bess. wire, Pittsburgh	3.675	3.475	3.425	3.05
Wire nails, Pittsburgh	4.25	3.975	4.125	3.75
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$60.00	$52.00	$50.00	$38.00
Slabs, Pittsburgh, Chicago	47.50	43.60	42.00	39.00
Rerolling billets, Pittsburgh	47.50	43.60	42.00	39.00
Wire rods 7/32 to ¼-inch, Pitts.	2.825c	2.60c	2.55c	‡2.30c

‡ Base, No. 5 to 9/32-in.

Pig Iron

Bessemer, del. Pittsburgh	$37.83	$36.03	$34.83	$29.77
Basic, Valley	36.00	34.20	33.00	28.00
Basic, eastern del. Philadelphia	39.54	36.92	35.52	29.93
No. 2 fdry., del. Pgh. N. & S. sides	37.33	35.53	34.33	29.27
No. 2 fdry., del. Philadelphia	39.22	37.61	36.02	30.43
No. 2 foundry, Chicago	36.00	34.20	33.00	28.50
Southern No. 2 Birmingham	33.38	31.98	29.88	24.88
Southern No. 2, del. Cincinnati	38.25	86.85	34.75	28.94
Malleable, Valley	36.50	34.70	33.50	28.50
Malleable, Chicago	36.50	34.70	33.50	28.50
Charcoal, low phos., fob Lyles, Tenn.	44.00	43.00	40.50	33.00
Gray forge, del. McKees Rocks, Pa.	36.66	34.86	33.66	28.61
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.25	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$42.50	$37.20	$30.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	40.50	38.55	28.35	18.75
Heavy melt. steel, Chicago	42.25	35.95	29.25	18.75
Rails for rerolling, Chicago	49.75	43.20	34.50	22.25
No. 1 cast, Chicago	43.50	41.10	38.50	20.00

Coke

Connellsville, beehive furnace	$12.00	11.20	9.125	8.75
Connellsville, beehive foundry	14.50	13.05	10.375	9.50
Chicago, oven foundry, del.	18.50	17.46	16.10	15.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $45-$50, sales by smaller interests on negotiated basis at $65 or higher. Detroit, del., $53; eastern Mich., $54.

Forging Quality, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $55-$58; Detroit, del., $61; eastern Mich., $62.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69, eastern Mich., $70.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $60; sales by smaller interests on negotiated basis at $66 or higher.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69.

Wire Rods: Pittsburgh, Chicago, Birmingham, 7/32 to ¼-in., inclusive $2.80-3.05 per 100 lb. Galveston base, $2.95. Worcester, 2.90c. San Francisco (base del.), $3.22.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.90c; Detroit, del., 3.05c; eastern Mich., 3.10c; New York, del., 3.31c; Phila., del., 3.28c; San Francisco (base, del.), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.58c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.45c; eastern Mich., 3.50c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.70c; Toledo, 3.75c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.25c; eastern Mich., 4.30c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del.), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base price upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c; double refined, 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; Philadelphia, del., 3.00c; New York, del., 3.09c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit. Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Detroit, del., 3.70c; eastern Mich., del., 3.75c; New York, del., 3.96c; Philadelphia, del., 3.93c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.85c-3.95c; New York, del., 4.24c; Philadelphia, del., 4.15c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc), corrugated 10 cents extra; Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.90c. Granite City base prices 10 points higher. Los Angeles (base, del.), 5.24c; San Francisco (base, del.) 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.85c-4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.95c; Granite City, base, 4.05c; Detroit, del., 4.10c; eastern Mich., 4.15c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c. Electrical: Pittsburgh, Chicago, Gary, 5.35c; Granite City, Kokomo, 5.45c.

Motor: Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c.

Dynamo: Pittsburgh, 6.45c; Granite City, 6.55c. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; San Francisco (base del.), 3.605c; Los Angeles (base del.), 3.60c.

Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.70c; eastern Mich., 3.75c; Worcester, base, 3.75c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.00, 7.15c; over 1.00, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $13.50; 15-16 $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, Claymont, 3.15c; Geneva, Utah, 3.10c; New York, del. 3.24c; Phila., del., 3.15c; St. Louis, del., 2.77c; Boston, del., 3.16c; San Francisco and Los Angeles, del., 3.29c-3.46c.

(Central Iron & Steel Co., Harrisburg, Pa., 4.15c, basing points.)

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.00c; Phila., del., 2.94c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.14c; Kaiser, del., San Francisco, 3.41c.

Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, fob Phoenixville.)

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer *$3.55-3.80
Spring (except Birmingham)....**$4.25-**4.50

Wire Products to Trade

Nails
Standard and cement-coated..... †$4.25
Galvanized ..... ‡$4.00
Staples, polished and galvanized..... $4.25
Wire, Merchant Quality
Annealed (6 to 8 base) ..... §$4.20
Galvanized (6 to 8 base)..... §$4.65
Fob Pittsburgh, Chicago, Birmingham, per base column)
Woven fence, 15 gage and heavier... ††91
Barbed wire, 80-rod spool..... ††101
Barbless wire, twisted 94
Fence posts (no clamps) ..... ††90
Bale ties, single loop ..... ††91

* Worcester, $3.65, Duluth, $3.60, base. San Francisco (base, del.) $4.26 for bright basic only.

** Worcester $4.60, Duluth and Trenton, N. J., $4.75, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

† Worcester $4.55, Cleveland $4.35, base. San Francisco (base, del.) $5.03.

‡ Duluth $4.00, Cleveland $4.10, base. San Francisco (base, del.) $4.78.

§ Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed; $4.65, galvanized. San Francisco (base, del.) $4.91, annealed; $5.36, galvanized.

†† San Francisco (base, del.): Woven fence, 144; barbed wire, 121; bale ties, 115. Duluth (base): Woven fence, 91; barbed wire, 101; fence posts 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $55-$56 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.05 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars, $3.25 per 100 lb, fob mill. Standard spikes, 4.00c-4.50c; screw spikes, 5.80c-6.40c. Axles, 4.10c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt Weld

In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	49	34	48½	33½	48	33
2½-3.	52	37	51½	36½	51	36
3½-6.	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

(Following prices and discounts nominal pending issuance of new schedules by producers.)

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	Seamless Hot Rolled	Seamless Cold Drawn	Elec. Weld Hot Rolled	Elec. Weld Cold Drawn
1"	13	....	$10.89	$10.62	$10.62
1¼"	13	....	12.90	10.59	12.58
1½"	13	$12.00	14.26	11.70	13.90
1¾"	13	13.65	16.23	13.31	15.82
2"	13	15.29	18.17	15.00	17.95
2¼"	13	17.05	20.26	16.71	20.00
2¼"	12	18.78	22.31	18.38	22.00
2½"	12	20.57	24.43	20.11	24.07
2¾"	12	21.80	25.89	21.27	25.46
3"	12	22.87	27.18	22.26	26.68
3¼"	11	26.88	31.94	26.15	31.33
3½"	11	28.86	34.30	28.06	33.64
4"	10	35.82	42.55	34.78	41.68
4½"	9	47.48	56.42	....	....
5"	9	54.96	65.30	....	....
6"	7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	48 off
⅝ and ⅞ x 6-in. and shorter.....	50 off
Larger diameter; longer than 6 in.....	47 off
Tire bolts	38 off
Step bolts	46 off
Plow bolts	57 off
Lag bolts	
¼ in. up to 1 in., 6 in. and shorter..	50 off
¼ in. up to 1 in., longer than 6 in...	48 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	51 off	.....
½-in. and smaller	.....	50 off
½-in.-1-in.	48 off	.....
⅝-in.-1-in.	.....	49 off
1⅛-in.-1½-in.	46 off	47 off
1⅝-in. and larger	.....	40 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in. smaller (10-20 bright).....	56 off
Upset (10-35 heat treated)	
⅝ x 6	51 off
¾, ⅞, & 1 x 6	47 off

Square Head Set Screws

Upset 1-in. and smaller	61 off
Headless, ¼-in. and larger	46 off
No. 10 and smaller	56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural	5.25c
Lebanon, Pa.	5.40c
⅞-in. and under	55-5 off
Lebanon, Pa.	55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301....	26.00c	29.50c	37.00c	22.00c	28.60c
302....	26.00	29.50	37.00	23.50	30.50
303....	28.50	31.50	39.00	29.50	36.00
304....	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50	51.00	40.50	51.00
310....	53.50	56.50	57.50	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
431....	21.00	24.00	31.50	19.00	24.50
440A ..	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403....	23.50	27.00	32.00	23.00	29.50
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29.50	20.00	25.50
420....	26.00	31.00	36.50	26.00	33.50
430....	21.00	24.00	31.50	19.00	24.50
430F ..	21.50	24.50	32.00	20.50	27.00
442....	24.50	28.00	35.50	26.00	35.00
443....	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	38.00	56.50
•501...	9.00	13.00	17.50	13.00	18.50
•502...	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices, per gross ton, do not include 3 per cent federal tax

PIG IRON

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$37.50	$37.00	$38.50	$38.00
Newark, N. J., del.	39.34	38.84	40.34	39.84
Brooklyn, N. Y., del.	40.50	....	....	41.00
Philadelphia, del.	39.22	38.72	40.22	39.72
Birdsboro, Pa., base	40.50	40.00	41.50	41.00
Birmingham, base	33.38	32.88	....	....
Baltimore, del.	39.78	....	....	....
Chicago, del.	37.12	....	....	....
Cincinnati, del.	38.25	....	37.75	....
Newark, N. J., del.	39.46	....	....	....
Philadelphia, del.	38.84	....	....	....
St. Louis, del.	37.37	....	36.87	....
Buffalo, base	36.00	35.50	37.00	36.50
Boston, del.	42.48	41.98	43.48	42.98
Rochester, del.	37.84	37.34	38.84	38.34
Syracuse, del.	38.50	38.00	39.50	39.00
Canton, Massillon, O., base	36.00	35.50	....	36.50
Chicago, base	36.00	35.50	37.00	36.50
Milwaukee, del.	37.32	36.82	38.32	37.83
Muskegon, Mich., del.	39.83	....	....	40.33
Cleveland, fob furnace	36.00	35.50	37.00	36.50
Akron, del.	37.67	37.17	38.67	38.17
Duluth, base	36.50	36.00	37.50	37.00
Erie, Pa., base	36.00	35.50	37.00	36.50
Everett, Mass., base	45.00	....	....	45.50
Granite City, Ill., base	37.00	36.50	....	37.00
St. Louis, del.	37.75	37.25	....	37.75
Neville Island, Pa., base	36.50	36.00	37.00	36.50
Pittsburgh, del., N. & S. Sides	37.33	36.83	37.83	37.33
Provo, Utah, base	36.50	36.00	....	....
Seattle, Tacoma, Wash., del.	41.60	....	....	....
Portland, Oreg., del.	41.60	....	....	....
Sharpsville, Pa., base	36.50	36.00	37.00	36.50
Steelton, Pa., base	37.50	37.00	38.50	38.00
Struthers, O., base	37.00	36.50	37.50	37.00
Swedeland, Pa., base	41.50	41.00	42.50	42.00
Troy, N. Y., base	38.00	37.50	39.00	38.50
Toledo, O., base	36.00	35.50	37.00	36.50
Cincinnati, del.	39.50	39.00	....	....
Youngstown, O., base	36.50	36.00	37.00	36.50
Mansfield, O., del.	39.48	38.98	39.98	39.48

† To Neville Island base add: 66c for McKees Rocks, Pa., $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)	....$45.50		
6.51-7.00	$46.75	9.01- 9.50	53.00
7.01-7.50	48.00	9.51-10.00	54.25
7.51-8.00	49.25	10.01-10.50	55.50
8.01-8.50	50.50	10.51-11.00	56.75
8.51-9.00	51.75	11.01-11.50	58.00

Feb Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.01-14.50%, $66.75, Jackson, O.; $70, Niagara Falls; $74, piglets, $72, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus, Fob furnace, Lyles, Tenn.... $44.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $36.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $42.00; Birdsboro, Pa., $45 base; Philadelphia, $44.22, del. Intermediate phosphorus, Central furnace, Cleveland, $39.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	$11.50-$12.50
Connellsville, foundry	14.00- 15.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$15.35
Chicago, outside del.	17.50
Chicago, del	18.50
Terre Haute, del.	18.05
Milwaukee, ovens	18.25
New England, del.	17.25
Birmingham, del.	15.00
Indianapolis, ovens	17.00
Cincinnati, del.	16.50
Ironton, O., ovens	15.50
Painesville, ovens	16.60
Cleveland, del.	17.90
Buffalo, del.	18.25
Detroit, del.	17.65
Philadelphia, ovens	15.50
Swedeland, Pa., ovens	15.50
Portsmouth, O., ovens	16.00
Fairmont, W. Va., ovens	15.75
Pittsburgh, del.	17.61

Coal Chemicals

Spot, gal. freight allowed east of Omaha. Effective as of Apr. 1, 1947.

Pure and 90% benzol	19.00c
Toluol, two degrees	23.00c
Industrial xylol	23.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "house-hold use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50–6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$32–$34

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.10	5.10	5.10	5.10	...	...	...	...	...
Shapes Structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. •10G	Gal. •24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½" & up	H-R Alloy (§4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ¾" & Thicker
††New York (city)	4.87	6.07	5.77[8]	6.07[5]	7.32[5]	4.97	....	4.97	5.52	6.97[9]	4.72	5.02	6.70
New York (country)	4.72	5.92	5.62[8]	5.92[5]	7.17[5]	4.82	....	4.82	....	....	4.57	4.87	6.55
Philadelphia (city)	4.64	6.23[9]	5.83[9]	5.84[5]	7.09[5]	4.78	5.63	4.78	5.48	6.92[12]	4.52	4.79	6.13
Philadelphia (country)	4.54	6.13[9]	5.73[9]	....	....	4.63	5.53	4.68	....	6.82[12]	4.42	4.69	6.03
Memphis, Tenn. (city)	4.82	....	5.88	....	....	5.02	....	4.97	5.98	....	4.97	5.17	6.88
Memphis, Tenn. (country)	4.72	....	5.78	....	....	4.92	....	4.87	5.88	....	4.87	5.07	6.78
Buffalo (city)	4.45	....	5.20[6]	5.90[5]	....	4.60	5.60	4.40	5.10	8.15	4.40	4.85	6.20
Buffalo (country)	4.30	....	5.05[6]	5.75[5]	....	4.45	5.45	4.25	4.95	8.00	4.25	4.70	6.05
Pittsburgh (city)	4.40•••	5.25[8]	....	5.65[5]	6.90[5]	4.50	5.50	4.55	5.25	7.05	4.55	4.75	6.10
Pittsburgh (country)	4.25•••	5.10[8]	....	5.50[5]	6.75[5]	4.35	5.35	4.40	5.10	6.90	4.40	4.60	5.95
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.638[5]	6.888[5]	4.488	5.35	4.40	5.10	6.908	4.611	4.55	6.111
Cleveland (country)	4.30	5.35[8]	5.05[8]	....	....	....	5.20	4.25	4.95	....	....	4.40	....
Cincinnati (city)	4.671	5.516[8]	....	5.716[5]	6.466[5]	4.694	....	4.703	5.353	....	4.744	4.903	6.244
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65[5]	6.90[5]	4.35	5.35	4.40	5.10	6.65[12]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50[5]	6.75[5]	4.20	5.20	4.25	4.95	6.65[12]	4.25	4.45	5.90
Milwaukee	4.599	5.649[8]	5.349[8]	5.799[5]	7.049[5]	4.499	5.499	4.549	5.249	6.949[12]	4.549	4.749	6.199
St. Louis	4.749	5.799[9]	5.499[5]	5.974[5]	7.224	4.649	5.774	4.699	5.424[12]	7.124	4.699	4.899	6.349
Birmingham (city)	4.45[20]	....	....	5.80[5]	....	4.45[20]	....	4.40[20]	....	....	4.40	4.65	6.86
Birmingham (country)	4.30[20]	....	....	5.50[5]	....	4.30[20]	....	4.25[20]	....	....	4.25	4.50	....
Omaha, Nebr.	5.068	....	....	6.468	7.778	5.468	....	5.218	5.918	....	5.218	5.418	6.868
Seattle, Tacoma, Wash.	5.30[17]	....	7.10[5]	6.70[5]	....	5.60[17]	....	5.30[17]	7.45[10]	....	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 pounds and over; [1]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [5]—450 to 1499 pounds; [6]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 14,999 pounds; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 4999; [17]—300 to 9999 pounds; [18]—1500 to 1999 pounds; [19]—1500 to 39,999; [20]—400 to 3999 pounds; [21]—400 lb and over.

• Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled, except Indianapolis, Los Angeles, San Francisco where price represents annealed bars; •• add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; ••• 18 gage.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, $47, Palmerton, Pa., $48, Pittsburgh, 16% to 19% Mn, $46, Palmerton, $47, Pittsburgh.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie - Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn). Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8.40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.32; contract, $2.25; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High - Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

Ferrovanadium: V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 14.80c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22.00c, 0.2% 21.75c; 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l.; and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots. **S. M. Ferrochrome, high carbon:** (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c, and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched 0.25c higher.

Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight

allowed: 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l., 14.10c; 2000 lb to c.l. 15.60c; central, 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn., max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Price per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80c, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western; spot up 0.25c.

CMSZ Alloys 4 & 5: (Alloy 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract or spot, bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80c, 15.55c, 19.05c, 19.80c, western.

Zirconium alloy: 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c; spot up 0.25c.

Zirconium alloy: Z 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; smaller lots 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed

Tungsten Metal Powder: Spot, not less than 98.8%, $3.05, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Nonferrous Metal Markets Continue Quiet

Buying remains orderly with prices unchanged . . . Labor trouble at mines and smelters being adjusted

NEW YORK—Pattern for settlement of the dispute between metal producers and workers was determined last week when an agreement was reached between representatives of the International Union of Mine, Mill & Smelter Workers Union (CIO) and managements of Kennecott Copper Corp.'s Utah mine and mills and of American Smelting & Refining Co.'s Perth Amboy, N. J. refinery. The agreements call for a wage increase of 12 cents an hour plus 3 cents additional for fringe adjustments, including paid holidays. Negotiations were continuing at an accelerated pace at other mining and milling properties.

COPPER—Activity in the market here, for both domestic and export shipments, was quiet last week. Prices held unchanged on the basis of 21.50c, Connecticut Valley, for electrolytic.

Exports of refined copper in June amounted to 14,363 tons, or a further increase of 3400 tons over the May total and a new high for the year to date. The June increase was attributed chiefly to increases of about 5000 tons in shipments to the United Kingdom, 2072 tons to India, and 1030 tons to Italy. Total exports of refined copper during the first half of this year amounted to 64,156 tons compared with only 25,910 tons in the like period in 1946.

LEAD—Total stocks of lead held by smelters and refiners as of July 1 declined slightly to 160,247 tons from 168,737 tons on June 1, and were the smallest reported in the past year, according to the American Bureau of Metal Statistics. The decline was due chiefly to a drop of 8900 tons in stocks of refined lead to 27,879 tons on July 1 and a decline of about 3825 tons in stocks in ore and matte and in process at smelteries. This decline was partly offset by a gain of 2380 tons in lead content of base bullion at smelteries and refineries to 13,743 tons and an increase of about 1950 tons in stocks in process at refineries which amounted to 14,854 tons on July 1. Stocks of antimonial lead on July 1 showed an increase of about 500 tons to 9957 tons.

Total receipts of lead in ore and scrap by smelters only increased moderately during June to 48,747 tons from 43,193 tons in the preceding month. This brought the total for the first six months to 270,608 tons compared with 195,573 tons for the like period a year ago, when operations in the industry were hampered by strikes. The June increase was attributed chiefly to a sharp gain in receipts of lead in scrap which advanced to 11,768 tons from 6873 in May. Receipts of domestic lead in ore in June showed little change at 33,688 tons.

Robert Lindley Ziegfeld, acting secretary, Lead Industries Association, recently said that: "There will soon be enough lead produced in the United States and elsewhere to balance consumers' needs and to more than balance them eventually. Our reserves of lead will continue to serve this country for many years to come, no one can say how long. These will be best discovered and developed by a mining industry free of bureaucratic controls and artificial incentives. There will be some changes, already started, in the pattern of lead consumption, some serious loss of markets and some important applications."

ZINC—Buying in the domestic zinc market was orderly last week with no pressure being exerted to obtain larger tonnages. Prices held unchanged on the basis of 10.50c, East St. Louis, for prime western.

TIN—Price of black plate, No. 29 gage, except canmaking quality, was advanced $6 a net ton on Aug. 1 to the basis of $3.90, fob mill, by a leading Pittsburgh producer. Also advanced was 8-pound roofing ternes, 107 pound base box, 112 sheets, 20 x 28 inches, from $13.50 to $14.10, fob mill. Tin plate for export has been advanced by 25 cents a base box for 107-pound coke tin plate, making the current spread between domestic and export prices 75 cents per box.

Output of tin in Malaya in June was equivalent to 2261 tons of fine tin, according to the Malayan Information Agency. This is an improvement over the average of the five preceding months but it was still less than one-third of the production rate in 1940-41. The output from this territory for the first six months of this year was about 11,000 tons.

The tin dredge Roosevelt arrived at Banka recently and will be placed in operation soon.

Tin prices held unchanged here last week on the basis of 80.00c, New York, for Straits.

NICKEL—Recovery of secondary nickel from nonferrous scrap in 1946 totaled 8248 tons, valued at $5,801,643, an increase of 27 per cent over the 6483 tons, valued at $4,538,100, in 1945, according to the Bureau of Mines. The increase in the recovery of secondary nickel was due to two factors: Accelerated use of nickel-silver scrap, principally by brass mills, and a sharp increase in the quantity of metallic scrap and residues used in production of nickel chemicals.

Electrolytic nickel prices hold unchanged on the basis of 35.00c a pound for cathodes, 99.9 per cent, base sizes at refinery, unpacked.

ALUMINUM—Recovery of secondary aluminum, declining for the second year in succession, totaled 278,073 short tons in 1946, valued at $79,839,044, according to the Bureau of Mines. The record year was 1944 when 325,645 tons were recovered. In 1945, recovery 298,387 tons, valued at $85,279,005.

Primary aluminum prices continued to hold unchanged on the basis of 15.00c a pound, delivered, for 99 per cent ingots.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, delivered Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.00c; 88-10-2 (No. 215) 27.25c; 80-10-10 (No. 305) 23.00c; No. 1 yellow (No. 405) 15.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 13.75c; No. 12 foundry alloy (No. 2 grade) 13.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.50c; grade 2 (92-95%) 12.75c; grade 3 (90-92%) 12.00-12.25c; grade 4 (85-90%) 11.50-11.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $84-$87 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb

Beryllium-Copper: 3.75-4.25% Be, $17 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg); $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 61.75c, per ounce.

Platinum: $53-$56 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.44c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq. ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electrodeposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 94.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb. 95.75c; less than 200 lb, 96.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., 60.00c; 100 lb kegs, 60.50c.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.00c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb. 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.50, No. 2 copper 16.50, light copper 15.50, composition red brass 13.25, auto radiators 10.25, heavy yellow brass 9.50, brass pipe 9.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.00, No. 2 copper, 16.50- 16.75, light copper, 15.50-15.75, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 13.62½.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.00-16.50, No. 2 15.00, light copper 14.00; No. 1 composition red brass 12.00-12.25, No. 1 composition turnings 11.50-11.75, mixed brass turnings 7.00, new brass clippings 12.00-12.50, No. 1 brass rod turnings 10.50-11.00, light brass 6.00, heavy yellow brass 7.00, new brass rod ends 11.00-11.50, auto radiators, unsweated 9.00, cocks and faucets 9.00-9.50, brass pipe 9.00.

Lead: Heavy lead 11.50-12.00, battery plates 7.00, linotype and stereotype 12.25-12.50, electrotype 10.75-11.00, mixed babbitt 12.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.00-5.50, new die cast scrap 3.75-4.00, old die cast scrap 3.00.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S, 7.50-8.00, old sheets 6.00, crankcase 6.00, borings and turnings 2.00, pistons, free of struts, 5.00.

Nickel: Anodes 18.50-19.00, turnings 15.50-16.50, rod ends 18.00-19.00.

Monel: Clippings 13.00-14.00, turnings 7.50-8.00, old sheet 11.00-12.00, rods 11.50-12.50, castings 9.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$42.00-43.00
No. 2 Heavy Melt. Steel	42.00-43.00
No. 1 Busheling	42.00-43.00
Nos. 1, 2 and 3 Bundles	42.00-43.00
Machine Shop Turnings	34.00-35.00
Mixed Borings, Turnings	34.00-35.00
Short Shovel Turnings	35.00-36.00
Cast Iron Borings	34.00-34.50
Bar Crops and Plate	48.00-49.00
Low Phos, Steel	48.00-49.00
Punchings & Plate Scrap	48.00-49.00
Cut Structurals	48.00-49.00
Elec. Furnace Bundles	47.00-48.00
Heavy Turnings	40.50-41.50
No. 1 Chemical Borings	42.00-43.00

Cast Iron Grades

No. 1 Cupola	43.00-44.00
Charging Box Cast	52.00-53.00
Heavy Breakable Cast.	37.00-38.00
Stove Plate	36.00-37.00
Unstripped Motor Blocks	40.00-41.00
Malleable	52.00-53.00
Brake Shoes	37.00-38.00
Clean Auto Cast	43.00-44.00
No. 1 Wheels	43.50-44.00
Burnt Cast	34.00-35.00

Railroad Scrap*

No. 1 R.R. Heavy Melt.	43.00-43.50
R.R. Malleable	52.00-53.00
Axles	46.00-47.00
Rails, Rerolling	48.00-49.00
Rails, Random Lengths	44.00-44.50
Rails, 3 ft and under	47.00-47.50
Rails, 18 in. and under	48.00-49.00
Railroad specialties	48.00-48.50
Uncut Tires	47.00-48.00
Angles, Splice Bars	47.25-47.75

*Brokers buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$41.00-43.00
No. 2 Heavy Melt. Steel	41.00-43.00
No. 1 Busheling	41.00-43.00
Nos. 1 & 2 Bundles	41.00-43.00
Machine Shop Turnings	31.00-31.50
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings	32.00-32.50
Cast Iron Borings	32.00-32.50
Bar Crops and Plate	42.00-42.50
Cast Steel	47.00-48.00
Punchings & Plate Scrap	42.00-42.50
Elec. Furnace Bundles	41.00-41.50
Heavy Turnings	37.00-37.50
Alloy Free Turnings	33.00-33.50
Cut Structurals	42.00-42.50

Cast Iron Grades

No. 1 Cupola	47.00-49.00
Charging Box Cast	44.00-46.00
Stove Plate	42.00-46.00
Heavy Breakable Cast.	43.00-44.00
Unstripped Motor Blocks	43.00-44.00
Malleable	56.00-57.00
Brake Shoes	42.00
Clean Auto Cast	50.00
No. 1 Wheels	45.00
Burnt Cast	42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	56.00-57.00
Rails, Rerolling	46.00-47.00
Rails, Random Lengths	46.00-47.00
Rails, 3 ft and under.	48.00-51.00
Railroad Specialties	48.00-52.00
Uncut Tires	46.00-48.00
Angles, Splice Bars	50.00

VALLEY

No. 1 Heavy Melt. Steel*	$42.50-45.50
No. 2 Heavy Melt. Steel	42.50-45.50
No. 1 Bundles	42.50-45.50
Machine Shop Turnings	35.00-36.00
Short Shovel Turnings.	36.00-37.00
Cast Iron Borings	36.00-37.00
Low Phos.	47.00-49.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	46.00-49.50

*Corrected price, based on sales as of July 29.

MANSFIELD

No. 1 Heavy Melt. Steel	$43.00
Machine Shop Turnings	35.00
Short Shovel Turnings.	36.00-37.00

CINCINNATI

No. 1 Heavy Melt. Steel	$39.00
No. 2 Heavy Melt. Steel	39.00
No. 1 Busheling	39.00
No. 1 Bundles	39.00
No. 2 Bundles	39.00
Machine Shop Turnings	33.00
Mixed Borings, Turnings	32.00
Short Shovel Turnings.	35.00
Cast Iron Borings	34.00

Cast Iron Grades

No. 1 Cupola Cast	47.00
Charging Box Cast	39.00
Heavy Breakable Cast.	41.00
Stove Plate	38.00
Unstripped Motor Blocks	41.00
Brake Shoes	37.00
Clean Auto Cast	46.00
Drop Broken Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt	42.00
R.R. Malleable	56.00
Rails, Rerolling	45.00
Rails, Random Lengths	45.00
Rails, 18 in. and under	50.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$33.00-33.50
No. 1 Busheling	33.00-33.50
Nos. 1 & 2 Bundles	33.00-33.50
No. 3 Bundles	33.00-33.50
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings.	30.00-31.50
Cast Iron Borings	30.00-31.50
Punchings & Plate Scrap	38.00-38.50

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
Heavy Breakable Cast.	29.00-31.00
Clean Auto Cast	37.00-38.00

BUFFALO

No. 1 Heavy Melt. Steel	$42.00-43.00
No. 2 Heavy Melt. Steel	42.00-43.00
No. 1 Busheling	42.00-43.00
No. 1 & 2 Bundles	42.00-43.00
Machine Shop Turnings	32.00-33.00
Mixed Borings, Turnings	32.00-33.00
Cast Iron Borings	32.00-33.00
Short Shovel Turnings.	34.00-35.00
Low phos.	44.00-45.00
Elec. Furnace Bundles.	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-42.00
Heavy Breakable Cast.	38.00-40.00
Malleable	50.00-52.00
No. 1 Wheels	38.00-40.00

Railroad Scrap

Rails, 2 ft and under	45.00-47.00
Railroad Specialties	45.00-46.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$40.00-41.00
No. 2 Heavy Melt. Steel	40.00-41.00
No. 1 Busheling	40.00-41.00
No. 1 Bundles	40.00-41.00
No. 2 Bundles	40.00-41.00
No. 3 Bundles	37.00-38.00
Machine Shop Turnings	31.00-32.00
Mixed Borings, Turnings	31.00-32.00
Short Shovel Turnings.	31.50-32.00
Bar Crops and Plate	44.00-44.50
Punchings & Plate Scrap	44.00-44.50
Cut Structurals	42.00-43.00
Elec. Furnace Bundles.	40.50-41.00
Heavy Turnings	40.00-41.00
No. 1 Chemical Borings	34.50-35.50

Cast Iron Grades

No. 1 Cupola Cast	48.00-49.00
Charging Box Cast	46.00-47.00
Heavy Breakable Cast.	46.00-47.00
Unstripped Motor Blocks	41.00-41.50
Malleable	58.00-60.00
Clean Auto Cast	48.00-49.00
No. 1 Wheels	47.50-48.00

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$36.00
No. 2 Heavy Melt. Steel	36.00
No. 1 Busheling	36.00
Nos. 1 & 2 Bundles	36.00
No. 3 Bundles	34.00
Machine Shop Turnings	25.00-25.50
Mixed Borings, Turnings	25.00-25.50
Short Shovel Turnings.	27.00-27.50
Punchings & Plate Scrap	37.00-37.50
Cut Structurals	37.00-37.50
Elec. Furnace Bundles.	36.25-36.50
No. 1 Chemical Borings	24.50-25.00

Cast Iron Grades

No. 1 Cupola Cast	41.50-42.00
Charging Box Cast	41.50-42.00
Heavy Breakable	41.50-42.00
Unstripped Motor Blocks	35.00-36.00
Malleable	51.00-53.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-36.00
No. 2 Heavy Melt. Steel	35.00-36.00
Nos. 1 & 2 Bundles	35.00-36.00
No. 1 Busheling	35.00-36.00
Machine Shop Turnings	26.00-27.00
Mixed Borings, Turnings	25.00-26.00
Short Shovel Turnings.	27.00-28.00
Bar Crops and Plate	37.00-38.00
Punchings & Plate Scrap	36.50-37.00
Chemical Borings	26.00-27.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-44.00
Charging Box Cast	38.00
Heavy Breakable Cast.	38.00-39.00
Stove Plate	36.00-37.00
Unstripped Motor Blocks	32.00-34.00
Clean Auto Cast	40.00-42.00

CHICAGO

No. 1 Heavy Melt. Steel	$42.00-42.50
No. 2 Heavy Melt. Steel	42.00-42.50
No. 1 & 2 Bundles	42.00-42.50
No. 3 Bundles	40.00-40.50
Machine Shop Turnings	37.00-37.50
Mixed Borings, Turnings	37.00-37.50
Short Shovel Turnings.	39.00-39.50
Cast Iron Borings	38.00-38.50
Bar Crops and Plate	44.50-45.00
Cast Steel	44.50-45.00
Punchings	44.50-45.00
Elec. Furnace Bundles.	43.00-43.50
Heavy Turnings	41.50-42.00
Cut Structurals	45.00-45.50

Cast Iron Grades

No. 1 Cupola Cast	42.00-45.00
Malleable	42.00-45.00
Clean Auto Cast	42.00-45.00
No. 1 Wheels	42.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00
Rails, Rerolling	49.50-50.00
Rails, Random Lengths	45.00-46.00
Rails, 3 ft. and under.	47.50-48.00
Rails, 18 in. and under	48.00-48.50
Railroad Specialties	46.50-47.00
Angles, Splice Bars	46.50-47.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$40.00-41.00
No. 2 Heavy Melt. Steel	39.00-40.00
Machine Shop Turnings	32.00-33.00
Short Shovel Turnings.	34.00-35.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	43.00-44.00
Charging Box Cast	37.00-38.00
Heavy Breakable Cast.	35.00-36.00
Brake Shoes	38.00-39.00
Clean Auto Cast	43.00-44.00
Burnt Cast	35.00-37.00

Railroad Scrap

R.R. Malleable	54.00-55.00
Rails, Rerolling	47.00-50.00
Rails, Random Lengths	42.00-43.00
Rails, 3 ft and under	43.00-45.00
Uncut Tires	43.50-44.50
Angles, Splice Bars	43.00-44.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$36.00
No. 2 Heavy Melt Steel	36.00
No. 1 Busheling	36.00
Nos. 1 & 2 Bundles	36.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	41.00
Stove Plate	39.00
No. 1 Wheels	36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.00
R.R. Malleable	42.50
Axles, Steel	39.00
Rails, Rerolling	41.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars.	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$19.04
No. 2 Heavy Melt. Steel	*19.04
No. 1 Busheling	*19.04
Nos. 1 & 2 Bundles	*19.04
No. 3 Bundles	*17.04
Machine Shop Turnings	*12.54
Bar Crops and Plate	18.00
Cast Steel	18.00
Alloy Free Turnings	8.00
Cut Structurals	20.00-20.50
Tin Can Bundles	17.00

Railroad Scrap

Axles	26.50
Rails, Random Lengths	21.00
Uncut Tires	28.00

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	22.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	20.00
Machine Shop Turnings	13.50
Mixed Borings, Turnings	13.50
Punchings & Plate Scrap	23.50
Cut Structurals	23.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast.	21.50
Stove Plate	23.00
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars	21.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
Nos. 1 & 2 Bundles	19.50
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	27.50
Elec. Furnace Bundles.	27.00

Cast Iron Grades

No. 1 Cupola Cast	30.00

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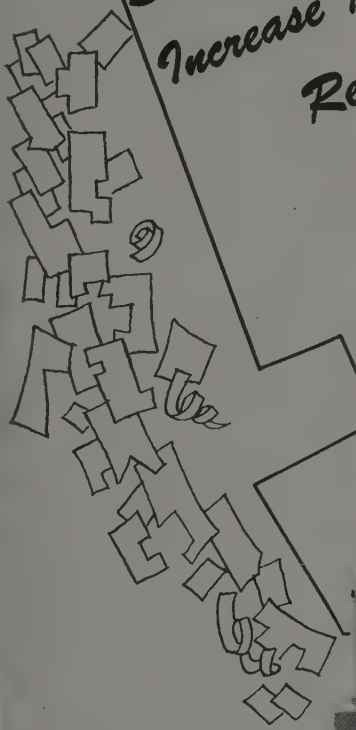
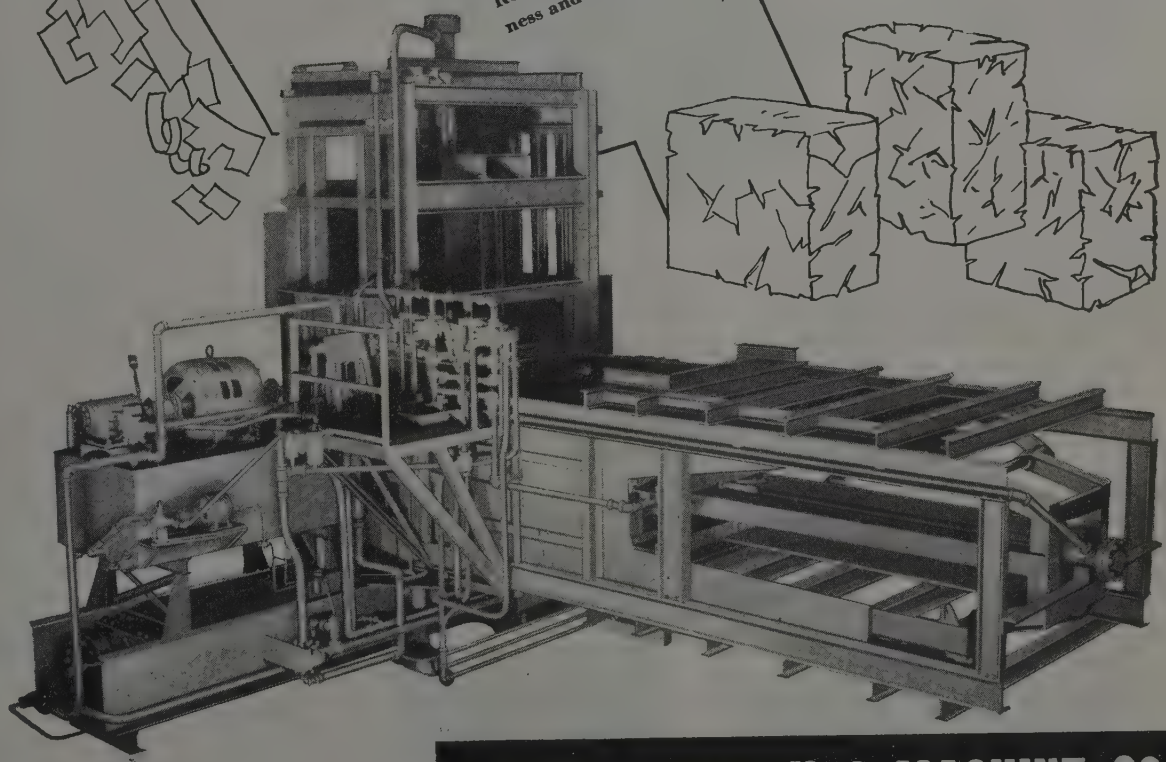
The Harris 4 A Baler is not comparable to any other press due to its revolutionary design. This incorporates 1—The vertically operating tramper door which means continuous operation in that a charge can be loaded while a bundle is being compressed. 2—The Harris 4 A Baler is equipped throughout with micromatic honed cylinders which means perfect concentricity and extremely close tolerances. This greatly increases the life of all packings as well as the life of the machine itself and gives a smooth operation. 3—The Harris 4 A Baler is equipped with Vickers vane-type rotary pumps and ultra modern valve equipment.

The Harris 4 A Baler located adjacent to your railroad siding is easily adaptable to conveyor equipment for delivering scrap to the press and the finished bundles to the car with an absolute minimum of labor. This reduces the production cost of bundles amazingly, and means: 1—Reduction in labor cost; 2—Increased profits; 3—Safety; 4—Cleanliness and orderliness in your plant.





Harris Scrap Metal Baling Press Model 4 A

HARRIS FOUNDRY & MACHINE CO.

Reclamation Engineers Since 1889

CORDELE, GEORGIA

Sheets, Strip . . .

Demand continues heavy and will remain in excess of supply through 1947

Sheet Prices, Page 138

Boston — Gradually emerging from confusion in digesting recent price increases, minor revisions in extras and other adjustments, producers are still unable to satisfy demand for flat-rolled steel. Allotment schedules set up for the fourth quarter make certain this situation will continue through the year. All price adjustments are not uniform, resulting in establishment of a dual base at Pittsburgh, Youngstown and Gary. This is contributing to buyers' perplexities. Price, however, is not currently a major factor with most consumers whose problem is to get enough steel to maintain production. Although pipelines on some consumer goods are filling, inventory buying is quite general in sheets and most other flat-rolled products. Most of the steel delivered since reconversion has gone largely into finished goods and in many instances inventories have never been brought into balance. Demand will not level off to replacement needs based on output until this point is reached. In some products this situation obtains, but not in sheets or strip. No serious test of prices may be expected until this is more general. Eventually, premium prices with others will be under pressure, but supply will have to build up substantially first.

Philadelphia—Some quotas being announced by midwestern sheet mills for delivery here in the fourth quarter indicate further withdrawal from the market where necessary to equalize with the eastern basing point. Some have obviously oversold in the current quarter and will have a substantial carryover in October; however, they had almost as large a carryover at beginning of this period, if not fully as large. So the matter of excess freight costs becomes an increasingly important factor as time goes on and will probably continue so as long as demand remains so pressing. Certain other producers, including one or two leaders in the Pittsburgh area, are maintaining present quotas, however.

New York—While not all sellers of narrow strip steel have announced new prices, the leading producer, as announced in last week's issue, has advanced prices on 0.25 carbon and under $7 a ton to 3.75c Worcester base, while another eastern interest is reliably understood to have advanced to the same base price on 0.049 and lighter and to 3.90c Worcester on 0.050 to 0.090. Demand continues fairly active, although there is apparently little consuming interest in tonnage for shipment beyond the end of this year.

New York—Some leading independents are still engaged in setting up quotas for fourth quarter, with the probability that they will make their allocations shortly. Those who have already set up quotas have done so on about the same scale as for the present three-month period, although at least one has set up smaller allocations.

Pittsburgh—Recent increase in flat rolled steel product prices has not materially affected demand. Consumers continue to press for deliveries and producers find themselves unable to meet requirements. As a matter of fact, there appears little likelihood of any easing in the situation until well into next year. Stampers are clamoring for increased tonnages of hot-rolled sheets and strip. However, producers are unable to keep pace with their needs although tonnage actually moving to stampers on a volume basis is larger than ever before in peacetime. As new cold-rolling facilities come into operation, the expectations are that the pinch in hot-rolled sheet and strip supplies will noticeably increase. Recent increase in pickling extras on hot-rolled material is seen as bringing this grade closer in line with cold-rolled.

Chicago — Sheet and strip producers report that pressure continues heavy, part of this being attributed to the desire of some consumers to make use of expanded facilities. This applies particularly to manufacturers of domestic appliances. In the furnace manufacturing field, some drop-off is reported because housing construction is not up to expectations—in fact, some furnace dealers are asking 60 to 90 days on invoicing. There is no question but that mill quotas to all customers will be absorbed virtually without exception over the remainder of this year, and there are numerous requests as to when books will be opened for 1948 business.

Cincinnati — Pressure for sheet tonnage continues unabated, with no effect on demand from the recent price increases. Mills, in making the first draft of fourth quarter schedules, allow for only moderate carryover which they are trying to cut through steady, high-level production. However, allotments of sheets and strip are not likely to exceed those in recent months. Action of the American

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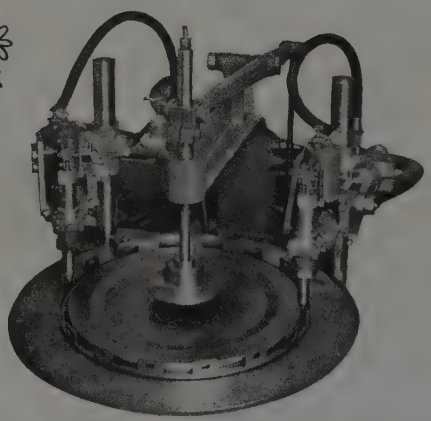

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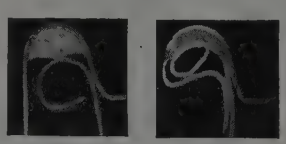

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DAREX "FLOWED-IN" COMPOUNDS MEAN BETTER STEEL PRODUCTS OF ALL KINDS

Rolling Mill Co. in making Ashland, Ky., the base for hot-rolled, instead of Middletown, O., is reflected in new pricing by district warehouses.

St. Louis—Effective July 28, Granite City Steel Co. raised prices of hot-rolled sheets $6 a ton, cold-rolled sheets $7, porcelain enameling sheets $8, galvanized sheets $8, electrical sheets $6 and tinmill black plate $6. Other tin plate prices remained unchanged. The company said the average price of basic products will be only $5 to $5.25 higher.

Sheets and strip production here continues on the gradual upgrade, but still considerably below capacity. Granite City Steel is getting only 60 per cent of its pig iron needs and asserts scrap quality has deteriorated to the point where twice as many buggies as formerly are necessary to each melt. All products are booked to the yearend. Next year's books will not be opened until October, and then only if progress on a new cold-rolling mill now under construction is sufficient to permit complete reappraisal of schedule possibilities.

Steel Bars . . .

Bar Prices, Page 138

Pittsburgh — Carnegie-Illinois Steel Corp. announced last week that it now is prepared to meet, within reasonable limitations, demand for hot-rolled alloy steel bars with hardening characteristics more restricted than in standard specifications. Because of the closer metallurgical control in manufacture, specification of the restricted range steels will entail a price extra amounting to 10 per cent of the net for grade.

New York—Hot-rolled carbon bar sellers in general have completed their medium sizes, about on a parity with fourth quarter allocations, with quotas, especially with respect to the small and current quarter quotas. Only in the larger sizes are they in position to offer any appreciable increase in tonnage. Cold-drawn carbon bars are in easier supply than hot-rolled, but the situation is still tight in the small sizes. Alloy bars continue in easy supply.

Most consumers are accepting higher prices recently announced without too many expressions of dissatisfaction, and, in fact, would place orders for substantially more tonnage in the small and medium sizes if it were available.

Philadelphia — While most sellers of hot carbon bars are promising about the same allotments for fourth quarter as they set up for the present period, one eastern producer has curtailed quotas; in general, future promises are somewhat disappointing to consumers. Most buyers, in fact, have been expecting larger quotas in the last quarter on all sizes except possibly the very smallest. However, some consumers have still not given up hope that supply will ease as the year advances, assuming no serious interruptions to production. Cold-drawn carbon bar quotas are definitely better and in alloy bars supply continues easy.

Boston — Only on sizes and grades produced at Buffalo is one large producer using that point for a base on merchant carbon steel bars; otherwise, the basing point is the producing mill at Pittsburgh or Youngstown. This involves a substantial ratio, notably in smaller sizes, and will have more of an effect on the warehouse buyer than manufacturing consumers, although new price structures will result for the latter in some cases.

Demand for bars is strong, although supply more nearly balances requirements than that of most of the other major carbon steel products. With the exception of flats, most mills have withdrawn allocation of cold-finished steel bars but they are still holding to quotas on hot-rolled. Alloys are easy and producers are seeking orders.

St. Louis—Merchant bar output is gaining a trifle but not enough to offset increasing pressure from car builders, makers of farm implements and various consumer goods. In general, customers are kept on allocations, which are likely to continue some time unless scrap and pig iron supplies improve substantially soon. Bar mills are operating near 95 per cent of capacity but raw materials occasionally set them back. Small carbon bars are especially scarce. Leading maker of merchant bars, wire and pipe has increased prices an average of $5 a ton.

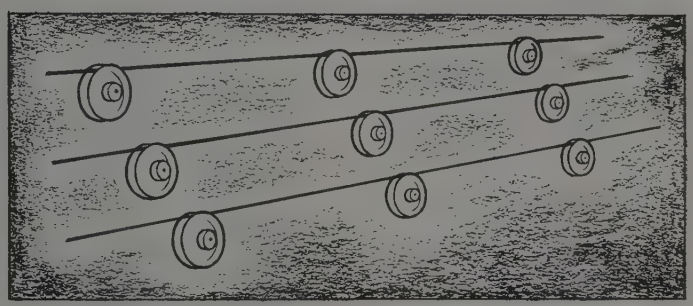
Semifinished Steel . . .

New York—Sparrows Point has been discontinued as a basing point on rerolling billets, blooms and slabs.

In another action, Carnegie-Illinois Steel Corp. has eliminated the Detroit and eastern Michigan arbitrary delivered prices on ceratin semifinished products.

SHUTDOWNS NOW STOPPED

during wire-coating process —



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Solution: A strip of Fullergript was produced in a tiny size, small enough to fit down into the pulley groove. This brush strip was made with .010 crimped stainless steel filler, and because of the brush's all-metal construction, it withstood the heat while cleaning the pulleys. Production now continues uninterrupted.

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Plates . . .

Plate Prices, Page 139

Philadelphia—Some eastern plate mills are accepting limited tonnage for first quarter shipment, although they are the exception. Certain producers, who are refusing to take new orders for next year, now have tonnage scheduled for that position. This is due to inability to work off some business originally scheduled for this year and booked in some cases several months ago. Some mills, though, have a little capacity available for this year for their regular trade. Exporting is becoming more difficult, plate sellers asserting they now not only have to obtain special licenses for export but also import licenses from countries of destination, because of the monetary situation.

New York—Most plate sellers are in position to accept little new tonnage for shipment over the remainder of the year. Those who are selling on a quarterly basis have practically completed allocations which are on about the same basis as for the current quarter. Others, who have been booking future shipments all along, have little capacity left for 1947 and are considering nothing for shipment beyond. Plate sellers have completed price changes, at least for the time being, with the Coatesville, Pa., producer having made no revision in clad-steel plates.

Boston — No increase in tonnage is in sight for plate shops and industrial fabricators. Some fourth quarter allocations are 20 per cent lower and even more than 20 per cent lower in some instances. Light welding quality plates are difficult to obtain and selectivity in taking orders has centered heavily with two or three producers. Some mills will have substantial carryovers this quarter and their reductions in quotas for the last quarter stem from this situation as producers strive to get old tonnage rolled. Cutting deeply into plate output is carbuilding, although deliveries to car shops have been running well ahead of consumption. Unless car builders step up schedules materially some adjustments in movement of plates to these consumers may develop next quarter. Caught in the web of plate shortage is 50,000 tons for the Portland, Me., to Montreal 20-inch pipeline. Difficulty is met in locating a shop to fabricate the line. If plates can be made available, contract may go to a shipyard.

Pittsburgh — Demand for plates continues pressing. Higher prices just effected are not expected to materially affect demand. Carbuilders are particularly insistent for material being far behind on projected building schedules and ascribe the lag largely to unbalanced steel inventories. Some buyers insist platemaking capacity is far below consuming industry's requirements, pointing out that during the war conversion of continuous sheet mills to plate production filled the gap in plate needs at that time but that since then the continuous mills have been reconverted to sheet and strip production with the result that plate capacity today does not come up to needs.

Seattle — Plate fabricating shops report no easing of the steel supply and consequently are not interested in contracts requiring more material than is presently in stock. Many small jobs for tanks and boilers are being placed.

Wire . . .

Wire Prices, Page 139

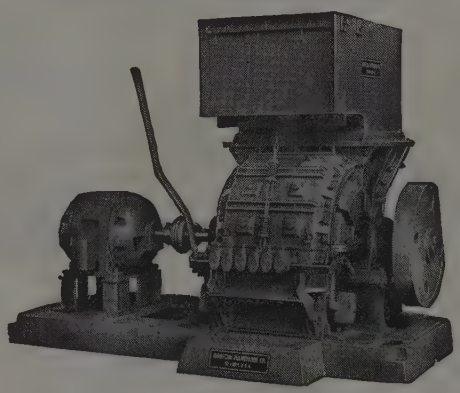
Boston — While mills have caught up on demand for a few wire products, including rope and more grades of spring and music wire, other products are scheduled fully for the balance of this year. There is a spotty improvement in rod tonnage available, but some eastern integrated producers are holding production close to requirements of their own finishing capacity. Screw manufacturers continue to be hampered by limitations in grades and sizes.

New York—Although the leading wire producer has announced increases on some grades, its list will probably not be completely revised for another several days. Meanwhile some wire sellers have not as yet announced any changes, although they expect to do so in the near future. Buying is brisk on most items, with little capacity available for new tonnage for shipment over the remainder of this year.

Chicago — Majority of wire consumers are seeking tonnages beyond the amounts allocated to them by wiremakers. Some of the critical items are barbed wire, heavy gage field fence and steel posts, baling wire, building type nails and steel telephone wire. Shortages are acute in several of these products.

Crush your turnings with an American Ring TURNINGS Crusher

For Easier Handling and Storage— Increased Oil Reclamation



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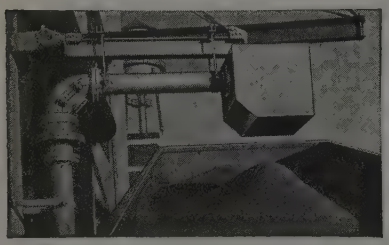

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Tubular Goods . . .

Tubular Goods Prices, Page 139

Pittsburgh—Babcock & Wilcox Tube Co. has increased base prices on seamless alloy pressure tubing as follows: Schedule B-1 carbon, ½ per cent molybdenum including 3 per cent chrome, up 6 per cent; schedule B-3 SAE alloy pressure tubing, up 7 per cent; alloy mechanical tubing schedule J, up 7 per cent. These increases were effective on shipments Aug. 4.

Babcock & Wilcox also announced average increases in the price of welded carbon steel tubes of approximately 7½ per cent to 8 per cent, effective on shipments beginning Aug. 6.

Seattle — Inquiry for cast iron pipe has declined, due to seasonal influences as well as extended deliveries. The potential requirements of this area are extremely heavy and indicate a long period of active buying as soon as mills can reduce order backlogs.

Structural Shapes . . .

Structural Shape Prices, Page 139

New York — Outstanding structural inquiry includes 7500 tons for Lillian Wald Houses, Sixth St. and East River Drive, on which new bids are to be asked Aug. 12, and 3000 tons for a New Jersey state bridge over the Pennsylvania and Lehigh railroads in Newark. Several other state jobs in New Jersey also are pending.

While there has been accumulation of inquiry, part of this is due to delay in closing on various jobs. New awards so far this month have been generally light. Higher prices on shapes, which became generally effective late in July and early this month, are being reflected in higher prices by fabricators.

Philadelphia—No material easing in shape supply appears and as in the past this can be traced in important measure to scarcity of raw steel for the product. Demand for structural shapes is disappointing, with slackness still ascribed to high building costs and a lack of stabilization even at high levels. However, most fabricating shops have substantial backlogs and considerable work is pending in most districts. Locally 425 tons are pending for a warehouse for E. J. Lavino & Co. at Plymouth Meeting, Pa.; 350 tons, plant addition, Bundy Tubing Co., Homestown, Pa.; and 270 tons, addition to theater and store for City Line Center Inc., Philadelphia. Also 900 tons, research building, Armstrong Cork Co., Lancaster, Pa., with bids closing Aug. 15 and 815 tons, state bridge, including steel flooring, South St., Wilkes-Barre, Pa. Awarded are: 260 tons, General Motors truck building, Philadelphia, to Bethlehem; 200 tons, Pennsylvania Railroad bridge, Perryville, Md., to Belmont Iron Works, Eddystone, Pa.; and 200 tons, New Jersey state bridge, Rt. 25, section 34-B, to Bethlehem.

Boston—Inquiry for fabricated structural steel is small, but enough work is coming out to match limited quotas given fabricating shops, while warehouses are operating with depleted stocks, notably in small sizes. Depending on the tonnage involved, deliveries on fabricated steel vary widely. Some of the larger shops are now scheduling for February, but smaller district units are not far behind normal delivery. Prefabricated houses are taking a heavier volume; approximately 3 tons to a unit, largely in small shapes. A Framingham, Mass., builder is aiming at 50 per week.

Pittsburgh — So far the increase in prices on structural shapes has not been reflected in demand. As a general thing, however, it is expected that some building projects will be killed off or temporarily deferred. This is especially true of municipal undertakings and public service projects. Backlogs on sellers' books, however, are substantial and such slackening in demand will not appreciably be felt immediately. As a matter of fact it may release some tonnage for pressing projects which up to now have been in an uncertain position with respect to shipments.

Seattle — Fabricators are more concerned with completing current contracts than they are of taking new business, in the face of continued shortage of steel Mill allocations are well below the needs of this area and deliveries are slow and unsatisfactory. No major project is up for immediate bidding, but a rush of small orders continues.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 138

Boston — Contractors are confronted with an increase of $11 a ton for concrete reinforcing bars, an advance of $6 in the base price and $5 for fabricating.

SEAVER

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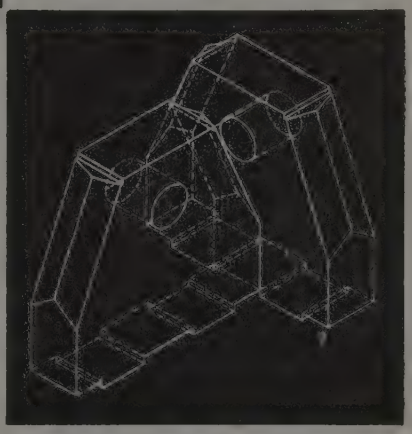

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Bars are among the shortest of building materials. District distributors, held to limited allotments, are not taking on forward commitments and buyers are frequently forced to fill even small lots from several sources.

Seattle — Reinforcing bar prices advanced $6 a ton here to the basis of $3.88. Rolling mills are making every effort to speed deliveries but in view of the many rush jobs and the volume of demand this is a difficult problem. Producers are taking new business equal to output so that backlogs remain practically stationary. Regular customers are getting the preference, mills being unwilling to accept new accounts. No bookings beyond the end of 1947 are being booked at present. The bulk of bookings is in small lots of 20 to 50 tons, chiefly for private and industrial construction.

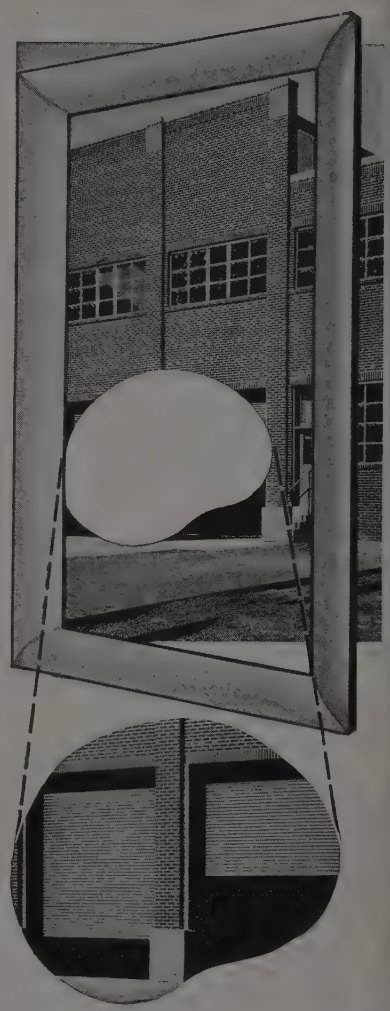
Pig Iron . . .

Pig Iron Prices, Page 140

Philadelphia—As finished steel prices generally become stabilized at the higher levels announced recently, trade attention becomes increasingly focused on scrap. With prices on steel grades, to say nothing of various other grades, at the highest peak on record and substantially higher than on pig iron and even on semifinished steel, the normal relationship between the two is reversed and the scrap market is clearly out of hand. The effect of scrap on pig iron is profound. With scrap more costly than iron by several dollars a ton, demand for iron is heaviest on record, even exceeding the war years. Integrated steel producers are turning more and more to the use of their own iron and are doing so, of course, at the expense of their merchant customers. One eastern producer has advanced pig iron for the second time in a fortnight following a $3.50 increase in the latter part of July. This interest has marked up prices $2.50 because of the further advances in steel scrap. It was either that or use more of the hot metal from its furnaces for the company's open hearths to the detriment of its regular pig iron customers.

The latest change in prices comes as a result of a further increase in the cost of steel scrap used to replace hot metal in the Swedeland, Pa., producer's open hearths. Should there be a marked downward revision in scrap prices this latest increase in iron may be revised accordingly. It is recalled that this producer took similar action earlier in the year on basic. This grade was advanced as a result of higher steel scrap prices, only to be reduced later when scrap declined. It is doubtful if foundry consumers will receive quite as much iron this month as last. One leading producer, in fact, is reducing quotas slightly because of repairs which necessitated taking the wind off for 10 hours. Coke remains very scarce.

New York — With the normal differential between pig iron and scrap so greatly out of line (scrap actually being substantially higher than pig iron), demand for iron is as great as, if not greater than, at any time in recent months. However, furnaces have not been able to step up their production in any appreciable degree and have allocated their tonnage for this month on virtually the same basis as for July. Unless there is some fairly substantial drop in scrap, and this does not appear to be too promising, it



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ROLLING DOORS

would not prove surprising but what there will be another increase in pig iron within the next several weeks. Certain merchant stacks have indicated at least that they may take such action. According to reliable reports here, Lone Star Steel Co. of Texas will get into production some time next month. This seller is revising prices, but as yet has made no announcement.

Boston — The volume of Buffalo and Pennsylvania iron, supplementing Mystic production, is small and limited to scattered carlots. Consumers hold small inventories and most of them are squeezed between iron shortages and high scrap prices, the ratio of melt of the latter being abnormally high. Probably the first improvement in supply of pig iron, not now in sight, will be absorbed by the restoration of iron-scrap melt ratios by most melters. No Texas iron is likely to be shipped into this area.

Buffalo — Resistance to higher prices appears to be growing greater at the customer level, resulting in a further falling off in demand for castings. But, as noted previously, the overall pig iron requirements of foundries continue to exceed the supply. Another upward revision was announced last week by the Hanna Furnace Corp. Effective Aug. 5, the company increased by 25 cents its silicon differential for blast furnace silvery iron to $1.25 for each 0.50 per cent above 6.50 per cent. It was explained that the increased cost of coke was the chief reason for the advance. Republic Steel's second blast furnace, which had been out of service several weeks for relining, was scheduled to be blown in Aug. 10.

Pittsburgh — Pig iron continues in extremely tight supply and little relief is in sight for the immediate future. Foundries are pressing for shipments and the recent increase of $3 per ton has not served to dampen demand to any extent. Although only two out of 47 stacks in this district are idle very little iron is open to merchant buyers. Castings producers find themselves in a very tight position in the matter of costs. Effective Aug. 1, most castings producers advanced prices about 10 per cent to compensate for increased raw materials costs and higher wages. Since the first of the year foundry pig iron costs have advanced $5 per ton, coke $5 per ton, scrap more than $10 per ton, with freight rates up 10 per cent. Currently foundry scrap is soaring with sellers asking $44 per ton and up.

Cincinnati — August allotments of pig iron to foundries in this district will be fulfilled, according to the improved trend in shipments. Melters despair, however, of receiving tonnage to compensate for the lighter shipments during July. Meanwhile, foundries are increasing pressure for tonnage, reflecting the fact that vacations are over, scrap is higher, and demands for castings insistent.

Chicago—Prospect of more merchant pig iron in this district in the near future by virtue of Inland Steel Co. lighting for the first time on Aug. 2 its eighth blast furnace (stack "A" acquired from the government last fall) was dashed when the company's No. 3 furnace broke through on Aug. 1 and was taken out for repairs which will require six or seven weeks. After producing merchant iron for some months, No. 3 recently was put on half-time merchant output when a shortage of basic iron for steelmaking occurred. In lighting "A" furnace, Inland had hoped to return No. 3 to full time merchant production. Foundries continue to schedule their operations in relation to available iron supply. Of the district's 42 blast furnaces, 38 are active currently, the remaining four all being idle for reconstruction or repairs.

Seattle — No pig iron has been received in this area for more than 30 days but shipments are expected shortly under the $3 price increase which makes the delivered price here $41.60, based on $36.50, Provo, Utah. Some of the largest foundries have fair inventories and have operated during the iron scarcity. The higher price will affect smaller plants which are using larger tonnages of cast iron scrap. The latter is available in fair volume at $27.50 for No. 1 cupola grade. This market may follow pig iron in advancing but thus far foundries report no difficulty in obtaining sufficient tonnage for current needs.

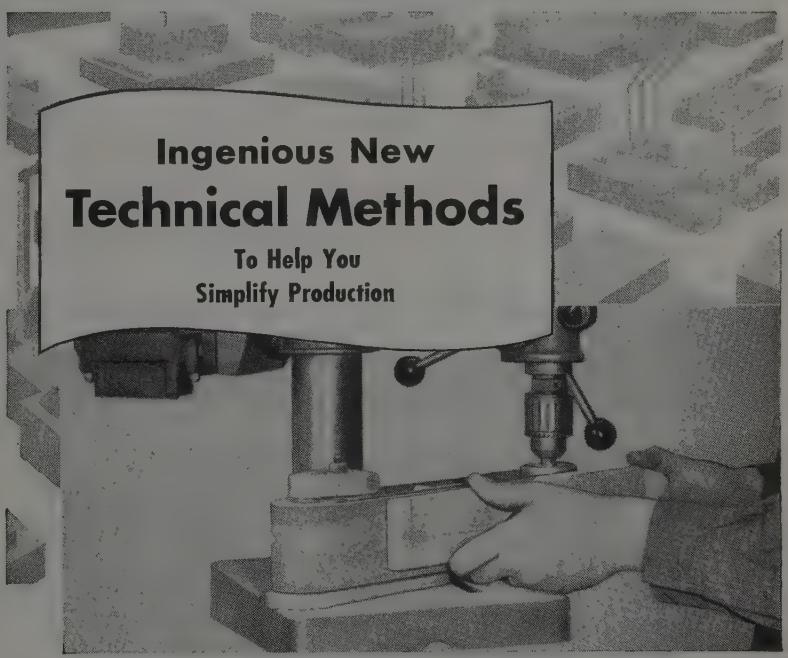
Rails, Cars . . .

Track Material Prices, Page 139

New York — Domestic freight car awards in July amounted to 14,865, of which 12,840 went to commercial car shops and 2025 to railroad shops, according to the American Railway Car Institute. This compares with a revised figure of 13,084 in June and brings the total for the first seven months to 79,122.

Car orders on hand and undelivered as of Aug. 1 involved 117,592, of which 87,518 were on order with commercial shops and 30,074 with railroad shops.

Freight cars delivered in July involved 5879, compared with a revised figure of 5527 in the preceding month. Of the July total, 4846 were delivered by merchant shops and 1033 by railroad shops.



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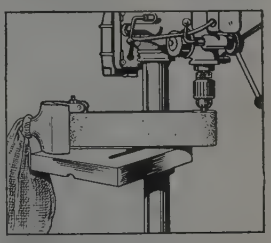

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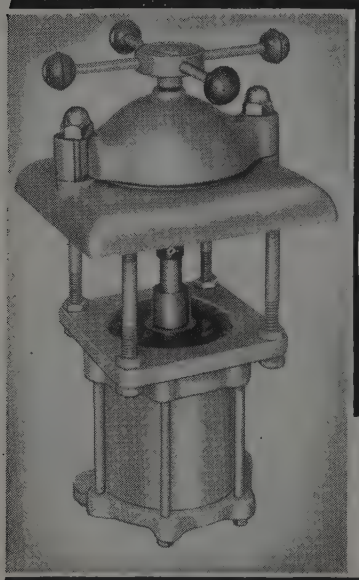

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Scrap . . .

Scrap Prices, Page 144

Hesitancy of mills in making new commitments checks upward price trend

Chicago—Purchase by a large consumer of No. 1 heavy melting scrap at $42.50 a ton delivered has advanced the market by $3 per ton and established an all-time high in this district. The new price is $8.50 a ton over prices prevailing in the first three weeks of July. So far other consumers have not purchased at the new level, new business being light. Before the $3 advance occurred, reports were common of dealer-broker transactions at $43 to $44, but material from out of the district appeared to be involved. Feeling is widespread that the price peak now has been reached.

Pittsburgh—Although the tone of the scrap market is strong here, sentiment among brokers and dealers is less buoyant than in the immediate past. Prices are still tending upward, No. 1 heavy melting steel being up about $1 per ton over a week ago on limited volume sales at $42 to $43. Several of the large steel mills are not buying and this has a tendency to hold the market in check. At the same time shipments to the mills on old contracts have been on a somewhat freer basis the past few days and this serves also as a rein on the market. Several railroad lists are being opened late this week and expectations are these lists will bring at least $43 for heavy melting. The Pennsylvania Railroad is taking bids on a miscellaneous offering of scrap, bids closing Aug. 12.

Philadelphia—Withdrawal of some of the leading consumers from the scrap market in this district temporarily resulted in an almost total suspension last week of trading in steel mill grades. Dealers, as well as leading consumers, are standing by awaiting developments. For the present, prices of steel mill grades are nominally unchanged.

Cast iron grades are higher than a week ago, although they may come in for some readjustment in the near future. No. 1 cupola cast is $48 to $49, delivered; charging box cast, $46 to $47; heavy breakable, $46 to $47; unstripped motor blocks, $41 to $41.50; malleable, $58 to $60; clean auto cast, $48 to $49; and No. 1 wheels, $47.50 to $48.

Baltimore & Ohio received last week $49 for No. 1 railroad heavy melting steel scrap for delivery in Pittsburgh district.

New York—Brokers' buying prices recently advanced to $37 from $35.25 on the principal steel mill grades, but declined $1 from those levels shortly thereafter. No. 1 and No. 2 heavy melting steel scrap, No. 1 busheling and Nos. 1 and 2 bundles are quoted $36, fob shipping point while No. 3 bundles are quoted $34. All other grades, including cast grades, held unchanged.

Boston — After exceeding the former peak price of last spring at $37 a ton for heavy melting steel scrap, the rise turned more hesitant last week. The bulge in scrap has been without substantial support of consumers who have been able to hold off buying. This includes most district steel scrap melters. The booming market has been due in part to buying by brokers to fill old orders, but even at higher prices the volume of scrap coming out is not heavy, although

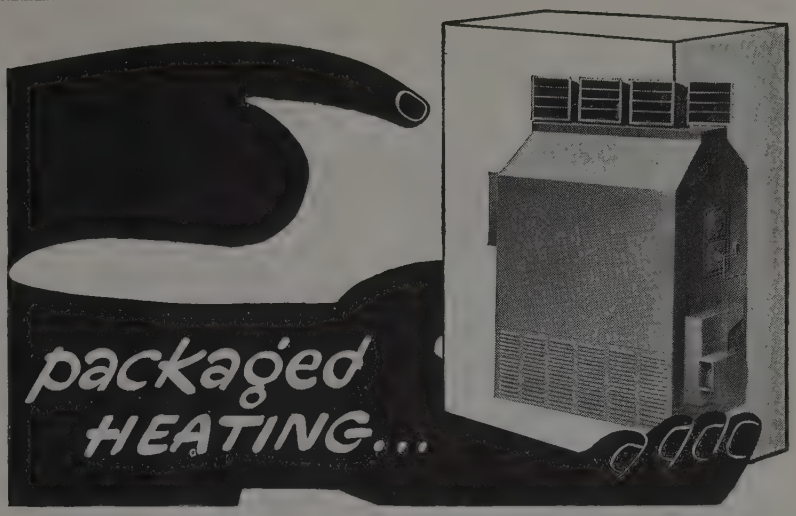
there is some increase in the production of industrial scrap. Outside buying also has contributed to the strength in cast iron grades.

Buffalo — Skyrocketing prices continued to dominate the scrap trade as fresh sales of steelmaking grades were reported at advances of $3 a ton. One mill consumer purchased approximately 10,000 tons within a range of $42 to $43 a ton. This range was $3 above the previous sale, but it was $5 a ton more than the mill, which made the purchase, paid for its last scrap. A smaller quantity was acquired by another mill at the new $42 to $43 range, which was $11 more than this buyer paid for its previous scrap. Both consumers specified on the latest sales that turnings would not be accepted. Shipments must be made up only of heavy melting, busheling and bundles. Other sales, however, carried machine shop turnings up to $32 to $33 a ton, a jump of $2. A similar increase was reported on short shoveling turnings which changed hands at $34 to $35. Consumers' complaints over poor quality scrap have been increasing. Concern over reserve stocks continue to mount as the volume of scrap coming out offers little opportunity for mills to build up stockpiles.

Cleveland — Undertone of the scrap market here turned weak last week, following a period of steadily rising prices. There was concerted action by leading mills to halt the uptrend in prices which reached a level here of $41 to $43. This level was established July 29 when sales were made to Valley mills on the basis of $42.50 to $45.50, the latter level prevailing on material moving at freight rates of $2.50 or over. Mills were hesitant last week in making new commitments pending clarification of the price situation. Mills' receipts on old contracts and from their own customers were sufficient to cover current requirements. Foundries are operating on a hand-to-mouth scrap basis, but operations have not been curtailed to any appreciable degree due to the shortage of raw materials.

Cincinnati — Prices on steelmaking scrap advanced $2 in a continuation of the strong market. Heavy melting steel is quotable at $39. Most cast grades were advanced $1, and in all grades there was active demand. Dealers and brokers were disappointed in that the rising trend failed to bring out heavier tonnages. Production scrap has failed to reach the volume attained earlier in the year, and the country scrap collections are seasonally light. Although the situation may have inspired speculative holding of scrap, market interests are convinced supply is unable to catch up with the extraordinary demands of melters.

St. Louis—Scrap shipments to this district, already short, are tending lower because of such seasonal factors as hot weather, farming conditions and vacations. The result is pressure for higher prices, which some melters fear will materialize before autumn. Some mills are being forced to take scrap off the ground. As a consequence, average reserves have dwindled to less than 30 days. Foundries also are becoming increasingly pressed for scrap. Railroad offerings are slow because of replacement difficulties and scrap from that source is expected to diminish before it improves. Some mills, already down to 25 per cent pig in their melts because of iron allocations, face production curtailment if scrap shipments drop much



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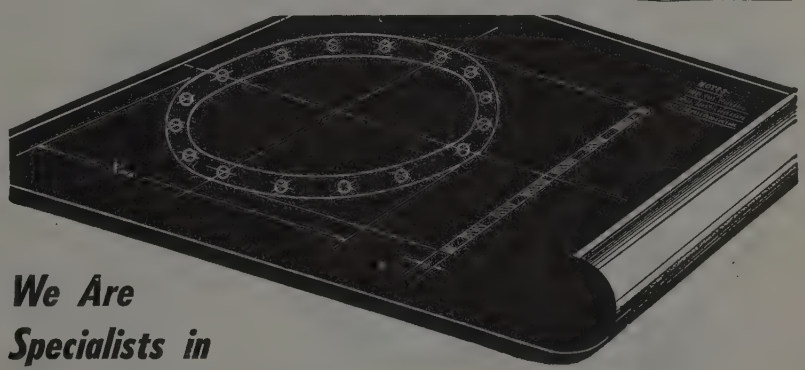

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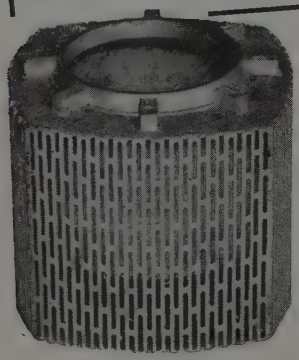

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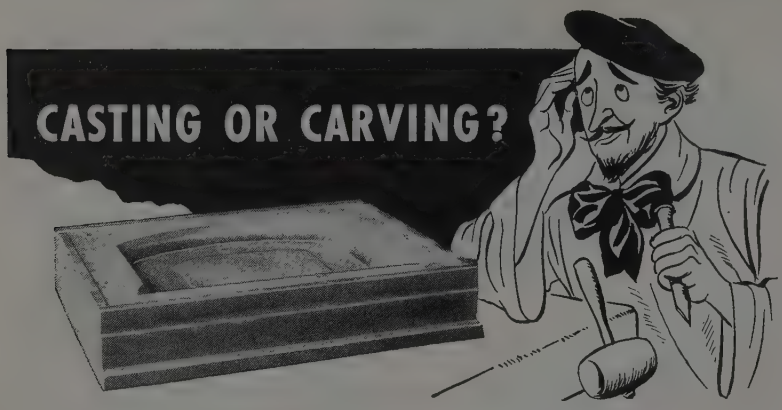

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farther. The higher prices are credited with maintaining the flow at its present volume, and some sources feel another boost may be necessary to keep it going through the summer. Mills are taking all they can get, meanwhile complaining that low scrap quality is reducing ingot production.

Seattle — The mill price of No. 2 heavy melting steel scrap advanced $2 a ton to $22, effective Aug. 1. Mills report scrap receipts are in satisfactory volume, being sufficient to cover consumption but not enogh to replenish inventories. Ship breakers are seeking additional surplus vessels, but government officials are slow in releasing obsolete tonnage. Dulien Steel Products Inc. is operating yards at Seattle and Kalama, Wash. Offers for ships have brought no reply. The former Army transport *Ludington* and the steamer *Will H. Point* have arrived at the Seattle plant of Puget Sound Bridge & Dredging Co. for breaking up.

Warehouse . . .

Warehouse Prices, Page 141

Pittsburgh — Local steel distributors have advanced their city and country prices in line with the recent advances effected by the mills. This means that the warehouse differential over the mill lists, on a percentage basis, is correspondingly narrowed though unchanged on a dollar basis. At the moment the local warehouses are struggling to catch up on backed-up shipments which resulted from the truck drivers' strike which was terminated Aug. 1, following a 60-day tieup. Expectations are it will take the warehouses at least two weeks or more to clean up accumulated business. Meanwhile, stocks continue unbalanced and receipts from the mills unsatisfactory. More conservative buying policy is expected on the part of consumers as result of the higher prices but distributors do not look for any particular letdown in business since requirements are far in excess of sellers' ability to satisfy.

New warehouse prices quoted in this district follow: Hot-rolled sheets, No. 18 gage, 4.25c; cold-rolled sheets, No. 10 gage, 5.10c; galvanized sheets, No. 10 gage, 5.50c; galvanized sheets, No. 24 gage, 6.75c; hot-rolled strip, 4.35c; cold-rolled strip, 5.35c; hot-rolled bars, 4.40c; cold-finished bars, 5.10c; structural shapes, 4.40c; plates, 4.60c.

New York—Iron and steel distributors here have now generally established prices at new levels, reflecting recent increases in mill products. Among the more recent changes is an advance in hot-rolled alloy bars of $1 a ton and increases in cold-rolled strip, one leading producer quoting 5.80c and at least one other quoting 5.95c. The lower price, however, is largely nominal as the supplier has little tonnage to offer.

Demand is exceedingly strong, with hot and cold rolled sheets, plates and narrow strip among the particularly critical items. Light structurals also are in pressing demand and light and medium sized bars. Trading would step up sharply if jobbers had more steel available.

A new schedule of quantity extras has been set up on hot-rolled alloy bars. Instead of base applying to quantities of 1000 pounds and over, it now applies, effective Aug. 5, to 1000 to 1999 pounds, with a deduction of 25 cents per hundred pounds on 2000 to 3999 pounds and 50 cents on 4000 pounds and over.

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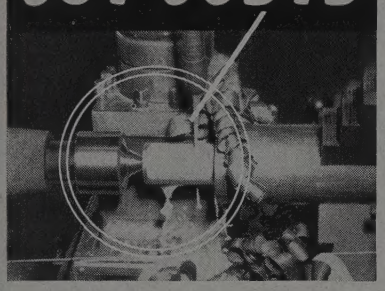

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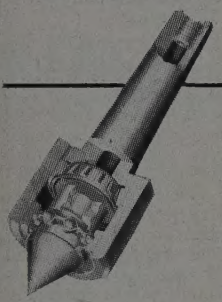

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Chicago—Warehouses continue to be pressed for steel products beyond their ability to supply in quantity desired. Particularly short in supply are flat rolled items, and smaller sizes of carbon bars and shapes. The situation is not critical in larger sizes of bars and alloys. Two new quantity deductions are now being offered on alloys—25c per hundred pounds for quantities between 2000 and 3999 pounds, and 50c per hundred pounds for quantities over 4000 pounds.

Cincinnati—Warehouses in this district have advanced prices, only to match mill increases. The jobbers' margin remains unchanged. Hot-rolled sheets hereafter will be priced on Ashland, Ky., base in contrast to previous Middletown, O., base. The change follows a new policy of the American Rolling Mill Co. Demand for scarce items remains way beyond supply. Business last month was done chiefly at the expense of inventory.

St. Louis—Steel warehouses here posted price increases approximating 10 per cent last week in response to the increases in mill prices. They were effective July 30. Contrary to hopes, stocks continue to decline, with little prospect now of improvement before the first of the year. Mills are promising better tonnage after Jan. 1, which promise distributors accept with reservations. They feel the mills must first catch up with railroad car builders' demands, and car foundries in this district are still so short they are scouring warehouses to pick up minute tonnage. With the exception of alloy and stainless steel, cold finished bars 1¼-inch and over, large size hot carbon bars and mechanical tubing goods, which are fairly easy, warehouse inventories are under 30 days as compared to the usual target of 60 to 75 days. Sizes are badly out of balance. There are virtually no inventories of sheets or plates and little more in structurals. In addition to car builders, demand is increasingly heavy from farms, body and trailer builders and motor and fan makers. Distributors are operating on a month-to-month basis, generally rejecting pleas of manufacturers to fill 90-day requirements. They continue to maintain unofficial rationing to insure fair distribution of available supplies.

Metallurgical Coke . . .

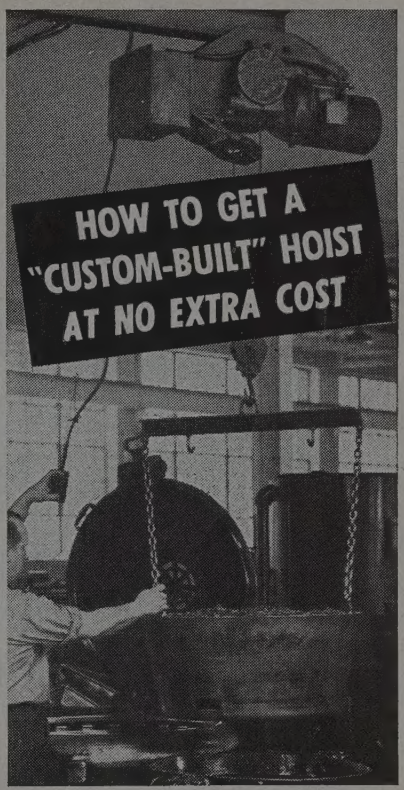
Coke Prices, Page 140

Pittsburgh—Scarcity of coke supplies shows little sign of easing. Recent advances in prices have been well received by buyers who continue to press for tonnage. Foundry coke is especially tight. Connellsville furnace coke is firm at $11.50 to $12.50; Connellsville foundry, $14 to $15. Oven foundry coke is strong at $15.75, Fairmont, W. Va., ovens.

Iron Ore . . .

Iron Ore Prices, Page 140

Cleveland — Shipments of Lake Superior iron ores in July increased 1,765,435 tons over the June movement and 1,765,435 tons over the July, 1946, total, according to the Lake Superior Iron Ore Association. Shipments totaled 12,613,820 tons in July compared with 11,457,455 tons in June and 10,848,385 in July of last year. For the season to Aug. 1, total shipments amounted to 38,892,539 tons, an increase of 15,043,700 tons over the total for the like 1946 period.



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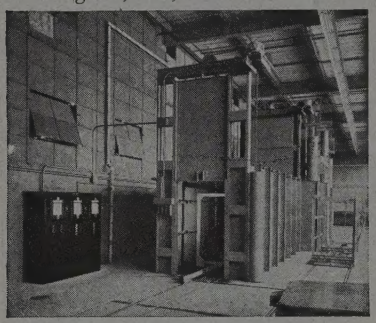

This can be run as a single chamber if desired but becomes a 2-room furnace when you drop the middle lift door. Each chamber has a circulating fan. In normal operation the loaded racks are moved by conveyor chain beneath the floor into the high temperature chamber. After treatment a limit switch opens an intermediate door, starts the conveyor motor and a circulating pump in the quench chamber adjoining the furnace at the nearer end in the pic (door open). The parts are moved quickly into the quench chamber. After quenching they are moved slowly to the outside track and around to the low temperature chamber at the far end of the furnace for aging.

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Carnegie-Illinois Steel Corp.

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	—Dollars per Gross Ton—			
CARBON STEEL PRODUCTS:				
Ingots, Forging	46.75	....	....	....
Blooms, Billets, Slabs				
Forging	55.75	56.00	56.00	....
Rerolling	45.75	46.00	46.00	....
Tube Rounds	69.75	70.00	70.00	....
	——Cents per lb——			
Stand. Structural Shapes	2.85	2.85	2.85	....
Carnegie Beams	2.85	2.85	....	....
Sheet Piling	3.35	3.35	....	....
Plates	3.00	3.00	3.00	2.98
Floor Plates	4.25	4.25	....	....
Skelp	2.65	....	....	2.63
H. R. Bars	2.95	2.95	2.95	2.93
Sheets:				
H. R., 18 Ga. and heavier	2.85	2.85	2.85	2.83
Long Ternes	3.90	....	3.90	....
Galvanized	3.90	3.90	3.90	....
C. R.	3.60	3.60	3.60	....
Vitrenamel	3.95	3.95	3.95	....
Electrical (Elec. Grade)	5.35	....	5.35	....
H. R. Strip	2.85	2.85	2.85	2.83
Stand. Rails, No. 1 OH	2.75*	....	....	....
Tie Plates	3.05*	....	....	....
Splice Bars (Stand. Rails)	3.25*	....	....	....
Light Rails, 60 lb & under	3.15	....	....	....
Axles	4.15	4.15	....	....

* Fob shipping mill.

ALLOY STEEL PRODUCTS:	—Dollars per Gross Ton—			
Ingots	56.75	....	....	....
Blooms, Billets, Slabs	66.75	67.00	....	....
	——Cents per lb——			
H. R. Bars	3.35	3.35	....	3.33
Plates	3.85	3.85	....	....
Structural Shapes	3.60	3.60	....	....
Bar Shapes	3.60	3.60	....	3.58
HIGH-STRENGTH STEEL; CORTEN:				
Plates	4.60	4.60	4.60	....
H. R. Sheets	4.35	4.35	4.35	4.33
C. R. Sheets	5.35	5.35	5.35	....
Galvanized Sheets	5.90	....	....	....
H. R. Strip	4.35	4.35	4.35	4.33
Structural Shapes	4.35	4.35	4.35	....
Carnegie Beams	4.35	4.35	....	....
Bars, Small Shapes	4.50	4.50	4.50	4.48
MAN-TEN:				
Plates	4.10	4.10	4.10	....
H. R. Sheets	3.75	3.75	3.75	3.73
H. R. Strip	3.75	3.75	3.75	3.73
Structural Shapes	3.85	3.85	3.85	....
Carnegie Beams	3.85	3.85	....	....
Bars, Bar Shapes	3.80	3.80	3.80	3.78
ABRASION RESISTING:				
Plates	4.20	4.20	4.20	....
H. R. Sheets	4.05	4.05	4.05	4.03
H. R. Strip	4.05	4.05	4.05	4.03
Bars, Bar Shapes	3.95	3.95	3.95	3.93

Tennessee Coal, Iron & RR

Birmingham—Tennesee Coal, Iron & Railroad Co. has announced following new delivered prices for the specified products within the range of sizes, grades, finishes, and specifications produced at its plants. All prices are subject to seller's prices in effect at time of shipment. These prices, effective Aug. 1, will apply on carload lots and are on the basis of fob cars, delivered within switching limits of Birmingham:

	Gross Ton
Blooms, Billets-Forging	$55.39
Blooms, Billets, Slabs—Rerolling	45.39
	100 lb
Structural Shapes	2.8375
Plates	2.9875
H. R. Bars	2.9375
Reinforcing Bars	2.7875
Sheets:	
Hot-Rolled	2.8375
H. R. Annealed	3.6875
Galvanized	3.8875
H. R. Strip	2.8375
Wire Rods	2.8375
Galvanized Nails	4.0375
All other Nails, Staples	4.2875
	Columns
Barbed, Twisted Wire	101
Gal. Farm Fence	91
Bale Ties	91

Prices on the following products will be increased in the amounts indicated: All rails; splice bars & tie plates; axles; manufactures' wires; and merchant wires, $5; track spikes, $7 per ton.

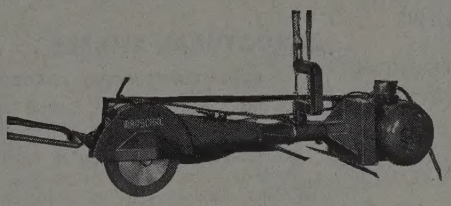
Columbia Steel's Schedule

San Francisco — Columbia Steel Co. has announced the following new delivered prices at Los Angeles and San Francisco for the specified products within the range of sizes, grades, finishes, and specifications currently produced at is plants at Torrance and Pittsburg, Calif. These prices apply on carload lots, effective as of Aug. 1, on the basis of fob cars, delivered within switching limits:

	Los Angeles	San Francisco
	—Per 100 lb—	
Structural Shapes	$3.47	
Tie Plates	....	$3.20*
H. R. Bars	3.625	3.63
Reinforcing Bars	3.325	3.33
Sheets:		
H. R., 18 Ga. & Heavier	3.54	3.545
H. R. Annld., 19 Ga. & lgtr.	4.57	4.575
Galvanized (flat & formed)	4.62	4.625
Gal. flat culvert copper steel	5.24	5.245
Well casing	4.29	....
H. R. Strip	3.60	3.605
Wire Rods	....	3.52
Nails:		
Galvanized	....	5.08
All other stand. Nails & Staples	....	5.33
Wire:		
Annealed Merchant	....	5.21
Gal. Merchant	....	5.66
Bright Basic	....	4.56
		Columns
Barbed & Twisted Wire	....	121
Gal. Woven Farm Fence	....	114
Bale Ties (single loop)	....	115

* F.o.b. cars, plant, Pittsburg, Calif.

Maximum
METAL REMOVAL



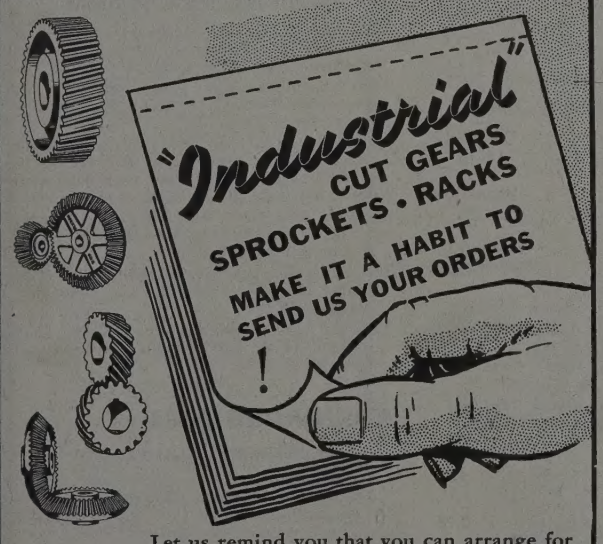
For maximum metal removal, use a Marschke Swing Frame Grinder. Massive, yet easy to maneuver, this Marschke Grinder provides smooth, true wheel rotation for steady contact between wheel and work. Furthermore, there is provision for correct wheel surface speed during all stages of wheel wear.

Marschke's smooth spindle rotation and correct speeds assure maximum metal removal with minimum wheel wear. Simplicity of construction, plus balance and maneuverability, contribute to efficient operation. Bearing housing assembly completely protects against grit and dirt. These Marschke Grinders quickly pay for themselves and give many years of trouble-free service.

Grinders with wheel sizes of 16", 20" and 24" are available for heavy duty foundry service. Write for further information.

VONNEGUT BRUSH-BACKED SANDER HEADS | VONNEGUT ELECTRIC MOULDERS | MARSCHKE GRINDERS & BUFFERS

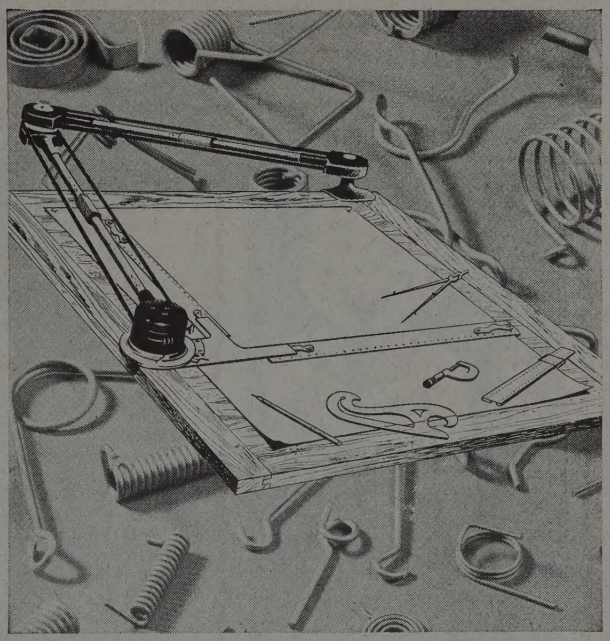
VONNEGUT MOULDER CORPORATION
1806 MADISON AVENUE • INDIANAPOLIS 2, INDIANA



Let us remind you that you can arrange for open time on our special equipment. Many top ranking manufacturers find it wise economy to utilize our facilities for Surface Grinding and machine work requiring precision to the 'nth degree.

Our automatics, lathes, boring mills, tooth grinders, internal, external and surface grinders, milling machines, multiple drills and broaches are new, modern and accurate. The men who operate them are craftsmen. Make our facilities part of your own plant.

INDUSTRIAL GEAR MFG. CO.
4545 VAN BUREN STREET CHICAGO 24, ILLINOIS

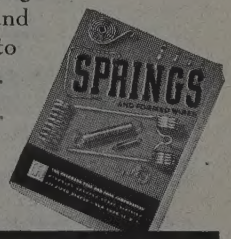


BLANK PAPER... and an Idea

The design of a satisfactory spring involves innumerable factors—load, deflection, size, shape, finish—to mention a few. Having determined these requirements, Wickwire Spencer engineers begin—with brains and blank paper—to establish the proper relationship between these factors and to design a spring that will stand up under the service requirements demanded.

The same exacting care that characterizes the design of springs and wire forms, is equally true as far as manufacturing procedures are concerned. Every coil of wire used in making springs undergoes exhaustive tests before manufacture. Skilled toolmakers set up machines that make springs conform to exacting specifications. And finally, the springs are tested before shipment.

This beginning-to-end-control has saved time, trouble and expense for scores of manufacturers—has won many loyal customers for us. Our engineers are at your service in designing any conceivable type of wire spring or wire form. Why not write us? Also, we would like to send you our free book, "Springs and Formed Wires." It's free—and full of valuable data relating to spring selection and performance. Address your request to Spring Dept., Wickwire Spencer Steel Division of C. F. & I., 2 New Bond St., Worcester 6, Mass.



CF&I WICKWIRE SPENCER SPRINGS

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

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EXECUTIVE OFFICE—500 Fifth Avenue, New York 18, N. Y.
SALES OFFICES—Boston • Buffalo • Chicago • Denver • New York
PACIFIC COAST—The California Wire Cloth Corp., Oakland 6, Calif.

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NEW YORK PITTSBURGH PHILADELPHIA

U.S. Steel Export Co.

New York—United States Steel Export Co., has increased its export base prices, effective as of Aug. 1. The changes cover carbon steel products, fob mill with freight included to New York, Philadelphia and Baltimore. Terms are net cash and subject to seller's price in effect at time of shipment from the mill.

The latest schedule follows:

	Gross Ton
Ingots, rerolling	$47.39
Billets, Blooms & Slabs:	
Rerolling quality	55.39
Forging quality	65.39
Wire Rods, in coils	72.64
	100 lb
Skelp	$3.13
Plates	3.58
Floor Plates	4.83
Structural Shapes	3.33
Merchant Bars	3.58
Concrete Reinforcing Bars	3.43
Sheet Piling	3.83
Hot-rolled Strip	3.33
Cold-rolled Strip	4.08
Bright Nail Wire	4.08
Black Annealed Wire	4.73
Galvanized Plain Wire	5.18
Bright Wire Nails	4.80
Bright Staples	5.60
Galvanized Staples	6.55
	80 Rod Spools
Galvanized Barbed Wire:	
Lyman 4 pt. 5 inch	$4.96
Glidden 2 pt. 4 inch	4.55
	Net Ton
Rails:	
Standard, over 60 lb	$68.00
Light, 60 lb and under	72.35
	100 lb
Joint Bars for Stand. Rails	$4.20
Tie Plates	4.20
Sheets:	
H. R. 18 Ga. and heavier	3.51
H. R., 19 Ga. and lighter	4.36
Cold Rolled, 15 Ga.	4.21
Galvanized, Plain 10 Ga.	4.38
Galv., Corrugated 10 Ga.	4.48
	Base Box
Tin Plate, Amer. Coke 107	$6.88

		Discount Percentage
Amer. Stand. Pipe, T. & C.:		
Buttweld,	2½" & 3" Black	52.7
	2½" & 3" Gal.	38.2
Seamless,	3½" to 6" Black	47.7
	3½" to 6" Gal.	32.7
English Gas Tubes, T. & C.:		
Buttweld,	2½" & 3" Black	52.0
	2½" & 3" Gal.	40.5

Ferroalloys . . .

Ferroalloy Prices, Page 141

New York — Electro Metallurgical Sales Corp. has raised ferrotungsten prices 25 cents per pound of contained tungsten, making the new eastern zone contract price $2.50 a pound in lots of 10,000 pounds or more of contained tungsten. Tungsten metal powder prices are increased 15 cents a pound so that the new eastern zone contract price for the melting grade becomes $3.05 per pound in lots of 1000 pounds or more. The new prices were effective Aug. 5 on a spot basis and on Sept. 1 for the contract users.

Although present stocks are ample to meet anticipated needs of all consumers, the company pointed out that non-contract orders can be accepted subject to availability and with the price being that applicable on the date of shipment.

New York—New Jersey Zinc Co. has advanced spiegeleisen prices $3 a ton, effective as of Aug. 6, to $47, Palmerton, Pa., for 19 to 21 per cent grade, and to $46 for the 16 to 19 per cent grade.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1800 tons, power house, Central Nebraska Public Power & Irrigation District, Bellevue, Nebr.; to Paxton & Vierling Iron Works, East Omaha, Nebr.; Bates & Rogers Construction Corp., Chicago, contractor.

900 tons, superstructure, E. 130th St. bridge over Calumet river, Chicago, for Department of Public Works, to Bethlehem Steel Co., Bethlehem, Pa.; William J. Howard Inc., Chicago, contractor.

220 tons, bridge, cont. 2814, Cutler, Ind., for State Highway Department, to Bethlehem Steel Co., Bethlehem, Pa.; R. L. Schutt, Indianapolis, contractor.

213 tons, lubricating and cutting oil plant, Socony-Vacuum Oil Co., Cicero, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

190 tons, addition, Columbia Tool Steel Co., Chicago Heights, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

189 tons, highway bridge, Union Grove, Ill., for state, to American Bridge Co., Pittsburgh.

185 tons, building, Elmer E. Mills Corp., Chicago, to Wendnagel & Co., Chicago.

150 tons, pulp mill building, Wood Conversion Co., Cloquet, Minn., to St. Paul Foundry & Mfg. Co., St. Paul.

135 tons, accelerator building, University of Chicago, Chicago, to Wendnagel & Co., Chicago.

117 tons, compressor station, Natural Gas Pipe Line Co., Hooker, Okla., to Mississippi Valley Structural Steel Co., Decatur, Ill.

STRUCTURAL STEEL PENDING

8500 tons, bridge over Mississippi river, East St. Louis, Ill.; William J. Howard Inc., Chicago, low on general contract.

7500 tons, Lillian Wald Houses, Sixth St. and East River Drive, New York city, new bids to be received Aug. 12.

400 tons, bridge, cont. 2834, Austin, Ind., for State Highway Department; Ben Hur Construction Co., St. Louis, low on general contract; bids July 29.

350 tons, New Jersey state overpasses, Newark, N. J., Union Building Co., Passaic, N. J., low on general contract.

190 tons, municipal power plant, Alexandria, Minn.; Midwest Engineering Co., contractor; bids July 20.

150 tons, also 60 tons reinforcing, Crater Lake bridge, Oregon; bids to Public Roads agency, Portland, Aug. 12.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2200 tons, Kostner Ave. auxiliary outlet sewers, Department of Public Works, Chicago, to Carnegie-Illinois Steel Corp., Chicago; Tully Construction Co., Chicago, contractor.

1000 tons, power house, Central Nebraska Public Power & Irrigation District, Bellevue, Nebr., to Joseph T. Ryerson & Son Inc., Chicago; Bates & Rogers Construction Corp., Chicago, contractor.

600 tons, hangar, Army Air Base, Rapid City, S. D., to Joseph T. Ryerson & Son Inc., Chicago; Steenberg Construction Co., St. Paul, contractor.

600 tons, veterans hospital, Minot, N. D., for U. S. Veterans Administration to Joseph T. Ryerson & Son Inc., Chicago; McGough Construction Co., contractor.

200 tons, lake water pump house, Cities Service Oil Co., East Chicago, Ind., to Ceco Steel Products Corp., Cicero, Ill.; Great